SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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Original Correspondence.

COAL BETWEEN THE SOUTH STAFFORDSHIRE AND SHROPSHIRE FIELDS.

Sir,—In accordance with the promise made in my letter on this subject, published in the Supplement to the *Mining Journal* of March 5, I will now lay before your readers the most important and recent explorations made in and about the western boundary fault of the South Staffordshire coal field. This is a subject of vast importance, and one which concerns our future coal supply. I may say that it has well nigh reached a sensation, as our Midland local papers are almost daily stocked with long theoretical opinions and articles on the subject. The finding of coal at Coton Park, near Burton-on-Trent, beneath the New Red Sandstone and Permian formations, the company formed to search beneath the same formations at Sandwell Park, and the proposal made by Prof. Beckett that a subscription be raised, and the South Midland Institute of Mining, Civil, and Mechanical Engineers be authorised to select suitable sites for a research between Staffordshire and Shropshire, have given the impetus for these discussions and expressions of opinion. I will first lay out, to my best ability, the full particulars of the plans and sections (I would much rather they were engraved, I could then explain them so much better, but I am aware you cannot spare enough of your valuable space for that purpose), and then give, combined with my humble opinion, that of several noted geologists. The western boundary fault of South Staffordshire, as will be seen from the Geological Survey Map, commences on the south at or near Pedmore, passing to the east of Stourbridge, through Kingswinford and Sedgley to the east of Wolverhampton, and on in a north-easterly direction, till it terminates some distance beyond Cannock. The part to which I would call particular attention is between Kingswinford and Sedgley, a little north of the former place, at the Earl of Dudley's Himley Colliery, where the researches I am about to lay before you have been and are taking place. The following sections show every strata, with its thickness, found in sinking the shafts at Nos. 3 and 7 pits. No. 3, which is situated about 70 yards from the fault, has been sunk some years, while No. 7, 50 yards from the fault, is just finished sinking.

No. 3 Pits.	Yds.	ft.	in.
Embankment	2	0	0
Soil	0	1	0
Red brick clay	2	0	0
Mottled ground	4	0	0
Dark parting	0	0	4
Mottled ground	1	1	6
Soft parting	0	1	0
Coal and batt	0	2	4
Dark fire-clay	3	0	8
Brown rock	2	1	0
Dark ground	2	1	0
Coal	0	0	2
Dark blue ground	2	0	0
Strong fire-clay, with nodules of ironstone	3	0	0
Mottled ground	3	0	0
Strong fire-clay, with nodules of ironstone	3	0	0
White sandstone rock	2	0	0
Blue ground	3	0	0
Strong fire-clay	5	1	0
Black slums	0	2	6
Strong brown fire-clay	1	0	0
White sandstone rock	4	0	0
Blue binds, containing ironstone	8	0	0
Black batt	0	1	0
Coal	0	1	0
Blue binds	2	0	0
Coal	0	1	0
Fire-clay	3	0	0
Black ground	3	0	0
Black batt	0	1	0
Superior coal	0	1	0
Brooch coal	1	0	0
Dark ground	1	2	0
Coal	0	1	0
Blue binds	7	2	0
Black batt	0	1	0
Flying reed coal	0	2	6
Fire-clay	1	2	0
Peldon	1	0	0
Blue binds rock	18	2	3
Peldon	1	0	0
Rock binds	12	0	0
Rock and peldon	4	0	0
Parting	0	0	1
Batt	0	2	2
White coal (South Staffordshire Thick coal.)	0	2	7
Tow coal (South Staffordshire Thick coal.)	0	2	0
Heath coal (South Staffordshire Thick coal.)	1	0	0
Brazils coal (South Staffordshire Thick coal.)	0	1	8
Fine and Veins coal (South Staffordshire Thick coal.)	1	1	6
Hard stone (South Staffordshire Thick coal.)	0	0	2
Stone & Patchel's coal (South Staffordshire Thick coal.)	1	1	0
Parting (South Staffordshire Thick coal.)	0	0	2
Sawyer (South Staffordshire Thick coal.)	0	2	2
Slipper (South Staffordshire Thick coal.)	0	2	0
Benches (South Staffordshire Thick coal.)	0	2	3
Blacktery ironstone measures	1	1	0
Whitery ditto	0	2	0
Gubbin & Rubble ditto	2	1	0
Heathen coal	1	2	0
Strong rock, with nodules of ironstone	4	2	0
Binds ironstone	0	0	4
White ironstone measures	1	2	0
Bottom ironstone measures	0	0	4
Dark ground	0	2	0
Sulphur coal	0	0	6
Depth of shafts	136	1	2

No. 7 Pits.	Yds.	ft.	in.
Embankment	2	1	0
Soil	0	1	0
Clay	1	2	0
Rotch	4	0	0
Mottled ground	7	0	0
Black parting	0	0	5
Mottled ground	0	2	6
Black parting	0	0	1
Mottled ground, containing nodules of ironstone	4	0	8
Rock	2	0	2
Dark ground	2	0	10
Rock and peldon	3	2	6
Mottled ground	1	0	4
Rock	1	2	0
Mottled ground	3	0	0
White rock	1	1	0
Mottled ground	3	2	3
Rock	2	0	3
Rough rock	1	0	0
Mottled ground	2	0	6
Strong fire-clay	1	0	0
Rough rock	1	1	0
Fire-clay	1	0	6
Black ground	0	0	6
Fire-clay	1	2	6
Hard rough rock	2	0	0
Strong light black ground, with layers and nodules of ironstone	7	2	6
Tough dark ground	0	0	6
Two-foot coal	0	1	6
Dark fire-clay	1	2	0
Dark binds	1	1	0
Light blue ground	2	1	0
Dark ground	0	1	6
Brooch coal	1	1	0
Dark ground	1	2	0
Little coal	0	0	6
Strong dark rock	2	0	0
Strong rock binds	1	0	0
Light blue binds, containing layers and nodules of ironstone	5	2	6
Black batt	0	1	0
Flying reed coal	0	1	6
Light fire-clay, with balls of ironstone	3	0	0
Band of ironstone	0	0	6
Strong rock binds	9	0	0
Sheddy rock	3	1	0
Strong light rock	3	0	0
Rock binds	0	1	6
Strong light rock	3	0	0
Rock binds	0	1	0
Strong light rock	1	0	0
Rock binds	0	2	0
Strong light rock	1	1	0
Strong rock binds	2	0	0
Strong light rock, with lisms or streaks of coal	8	0	0
Chance coal, containing nodules of sandstone	9	0	0
Dark ground, with nodules of ironstone	1	1	3
Thick coal	4	1	0
Blacktery ironstone measures	1	1	0
Whitery ditto	0	2	0
Gubbin and Rubble ironstone measures	2	0	0
Heathen coal	1	2	6
Parting and batt	0	1	0
White rock	3	0	0
Strong rock binds	2	0	0
Binds ironstone	0	0	6
White ironstone measures	2	1	0
Dark ground	1	0	0
Coal	0	1	0
Depth of shafts	145	1	9

I will reserve comment on the above sections till further on, except that I would draw notice to that of No. 7 pit, and remark the top of the Thick coal is so divided by white sandstone rock that it is called Chance coal, and is nearly 9 yards thick. The white ironstone measures are in the same shafts, undulated like the waves of the sea. I will next describe two sections of gate-roads, and of two headings, driven into the fault in No. 3 pits. The first section was made in 1867, by Mr. J. Hughes, the Earl of Dudley's surveyor, for Mr. J. Beete Jukes, M.A., F.R.S., F.G.S., &c., of the Royal Coal Commission. The second heading was made in the middle of last year, and visited by the members of the Dudley and Midland Geological Society on June 29. The heading was made under the directions of Mr. W. Spruce, and the section by Mr. G. Spruce (these two gentlemen are the Earl of Dudley's mine agents over the part of the estate in which the Himley Colliery is situated), by desire of Captain Frederick Smith, M.A., &c., the Earl's chief agent, who is most anxious for the furtherance of science. The first section commences with the gate-road, about 42 yards from the fault. The gate-road is at the bottom of the coal, and varies from about 2 to 3 yards in height; about 30 yards from the fault it shows a slip in the coal of about a yard; 4 yards nearer the fault a sump is made to the top of the coal, and shows that it is complete. A jackey pit is sunk down at almost the same spot from the bottom of the coal —that is, the floor of the gate-road—about 9½ yards, and gives Dark Ground, Whitery Stone, Whitery Measures, Gubbin Stone, Gubbin Measures, Rubble Coal, Crank Stone and Batt, Top Heathen Coal, Parting, Bottom Heathen Coal, Parting, Black Batt, Soft Parting, Fire-Clay Rock with Balls of Ironstone, Rock and Rock Binds. At 19 yards from the fault the coal is compressed from 7½ to 4¼ yards in thickness, and is covered on the top with white rock. The coal gradually thins out from here to the fault, in an upward direction, terminating in the white rock, the grain of the coal being at right angles with it—that is, in a vertical position. Then is found Black Shale, Grains Stone Measures, Whitery Stone, Gubbin Stone, Rubble Stone, Rubble and Crank Batt, Heathen Coal, and Tough Parting. These all run vertically and parallel with the finish of the Thick coal, and at the top almost turn on to it. They are partly surmounted by the Permians, which also set in next to the Tough Parting, slope in a downward direction from it, and continue on in the same way to the end of the heading, which is driven into them 12 yards. Towards the finish of the Thick coal, and near its centre, a piece of rock is shown, 4 yards long by 1 foot wide.

The fault is stripped for about a quarter of a mile, and the next section shows a heading driven into the fault, and gate-roads towards it, about 300 yards from the former one. The section commences at a spot about 120 yards from the fault, where the single gate-road diverges into two, one going with the Thick Coal, which here takes an upward turn, and the other going in a straight line under the first-mentioned. The Thick Coal rises to about 8 yards from the floor of the bottom or straight gate-road, and then gradually descends till it comes below it. The coal is about 8 yards thick, but it is compressed to 4 yards in one place, and surmounted by white rock, but spreads to its ordinary thickness again before it reaches the fault. The bottom gate-road goes through the Blacktery Measures, Whitery Measures, Gubbin Ironstone Measures, Rubble Ironstone, Rubble Coal, and Heathen Coal, which all bend upwards with the Thick Coal, till it runs into a lot of confused measures, in the centre of which a jack pit is sunk 6 yards, which gives confused White Ironstone Measures, Bottom Ironstone and Soft Parting, all sloping downwards to the east, and then comes a very much distorted white shale at an opposite angle to the other measures. The bottom gate-road continues on through the same measures as before, till it again joins the top one, which descends towards the fault, and runs right through the Thick Coal, which terminates at its regular thickness, and almost with a vertical downward inclination, the White or Top Coal finishing with a sharp angle at the fault. There is a curious feature to be observed here, and that is the Batt which runs at the bottom of the Thick Coal does not terminate at the bottom with it, but runs horizontally across it, and finishes with the Top or White Coal. I find I must here terminate, leaving the description of the heading made into the fault, &c., till next week, or I shall trespass too much on your space.

Dudley, March 22. Colliery Engineer.

COALMASTERS AND COLLIERS.

The pressure of other business in the House of Commons has compelled Mr. Bruce to postpone the commitment of the Mines Regulation Bill until after the Easter vacation; and the delay will be to a great extent compensated for by the further evidence afforded by Mr. Rupert Kettle's judgment in the case of Payne *v.* Crew, heard in the Dudley County Court, of the danger of incautiously throwing additional responsibility upon the coalmasters without at the same time investing them with additional power to enforce obedience to their orders from those whom they employ. In the conduct of colliery operations discipline is, beyond all question, the greatest promoter of safety, and it is equally, therefore, to the advantage of both coalmasters and colliers that discipline should at all times be strictly enforced. In the case of Payne *v.* Crew the colliers sought to recover wages in lieu of notice from the chartermaster by whom they were employed, and it was in the explanation of the grounds of the dismissal complained of as wrongful that the many important facts which may influence the course of legislation upon the subject were elicited. For the purpose of clearing a roadway to the bottom of the shaft, a certain piece of coal had to be removed, and the doggy ordered the colliers to *cut* it. This they refused to do, on the ground that it would not pay them to cut it; they offered, however, to *blast* it if he liked. As the doggy considered blasting needless, and wasteful to the coal, and as the colliers would not cut it they were summarily dismissed. Had the matter ended here much valuable knowledge would have been lost to the public which will now, no doubt, be utilised.

There being no dispute between the parties as to the cause of dismissal, it became necessary to the colliers to prove that they were justified in refusing to cut, and demanding the right to blast. With this object the colliers brought forward evidence to show that, according to the invariable custom, it was in their own discretion to use gunpowder or refrain from its use, as they thought fit, but this evidence was directly opposed by the other party; and, in the course of an elaborate judgment in the case, Mr. Kettle remarked that the case on the part of the plaintiff was that it was the ordinary and usual custom of working in the Saltwells Colliery, and particularly with the defendants' No. 21 pit, for miners to use gunpowder to blast the hard coal, instead of cutting it, whenever they thought it necessary; that the "patchels" required blasting, and always had been blasted by the workmen without let or hindrance; that it would take two or three hours more each day to do the stint unless powder was used. There was no evidence that the plaintiffs had attempted to obey the orders of the doggy, by trying if the coal were too hard for the fair and ordinary use of the pick. The contention was that they had a right to use powder at their own discretion to break down the coal. This was so much the ordinary and due course of working that the right to do it was part of the terms of the hiring. Practical miners of great experience were called, whose testimony supported this view of the case.

But the accuracy of all these statements was denied by the chartermaster, and the truthfulness of his statement was quite as well supported by evidence as that of the colliers. The evidence of the chartermaster's witnesses appeared to prove that blasting by the men was exceptional and permissive; that the ordinary way to get the patchels at Saltwells was by "cutting," and not by "blasting;" that miners were sometimes permitted to blast and sometimes forbidden, and that when they were so forbidden they discontinued the practice; that, in fact, gunpowder was not used on the discretion of the miner, but of those under whose supervision he worked; that he had no right to use it when forbidden, and generally use it only after having obtained permission. Mr. Kettle observed that there was no doubt that in the pit No. 21, where the dispute arose, there had been great laxity of practice in the matter of blasting. He had no doubt the defendant from time to time complained, and gave orders to the doggy upon the subject, for it was proved that blasting reduced coal valued 9s. to slack worth only 3s. 6d. per ton, but he had great doubt whether these orders were properly carried out. Although the doggy spoke of forbidding the practice, he could give no instance of a miner having been discharged for disobeying his order in this respect.

It has been several times ruled by Mr. Kettle that the employer cannot arbitrarily increase the customary stint during a subsistary contract with the miner. If it were otherwise, it would practically have the effect of allowing him to reduce wages—that is, getting more work done for the same money, without giving the regular notice, and he sought to trace the bearing of the principle upon the present case. If he could be satisfied that the right in the pikemen to use the easier mode of blasting, instead of the more laborious and tedious mode of cutting, was established, then there would be a clear analogy between the two cases, and the butty could not increase the work required to complete the "stint" any more than he could lengthen the "stint," itself during a current contract.

With evidence so conflicting, all that the judge could do was to look at the surrounding circumstances, and see if the balance of probability heavily preponderated on the one side or the other. Looking, then, at the fact that there are sometimes in parts of a coal pit, particularly in the old workings—"waste," "goaf," or "gob"—accumulations of inflammable gases which render the use of gunpowder highly dangerous to the whole pit's company; and that there are other cases less extensive, though not less directly dangerous, from the non-use of powder—cases, for example, where there are large masses of partly loose and impending coal, which cannot be touched with a pike without the chance of bringing an uncertain quantity down upon the body of the miners—he could not but think that an operation, the doing or omitting to do which involves two of the cardinal dangers of mining, could have been left as an ordinary rule of working the coal mines of this district to the discretion of the colliers themselves; and this for reasons too obvious to require detailed explanation. Some hardship may have arisen in this instance from the sudden imposition of a restriction after a period of laxity; but this would be no sufficient reason for abrogating a rule which tends to prevent waste to the master, and gives security from some dangers to the workmen. Mr. Kettle was of opinion that, under the rules in force the collier is bound to obey all orders of the managers relating to the working of the mines which are not unreasonable, including, of course, the time when, the place where, and the way in which coal should be gotten. And, assuming for the purpose of the fact of his judgment that the plaintiff's view of the case was right, and that there are two modes of breaking down coal, either of which the collier may under ordinary circumstances adopt at his discretion, still, as this is a matter relating to the working of the mine within the meaning of the rule, he thought it was within both the letter and the spirit of the rule competent to the manager to order the collier to adopt either one mode or the other.

Upon the whole, then, Mr. Kettle's judgment must be alike satisfactory to employers and employed. He decided that the refusal to cut the coal was a refusal to obey a lawful order of the manager, and was such an act of misconduct as justified the master, under local rule No. 2, to dismiss him without notice. The verdict was, therefore, for the defendant; but, considering the laxity which had been allowed in the pit, and that the defendant, the master in the relation of parties, ought to conduct his business in a manner which should lead to no uncertainty in the minds of workmen as to their rights, he decided that each party should pay their own costs.

COAL MINING IN NORTH WALES.

There is rather more activity at some of the leading collieries in North Wales than there has been, whilst some large mines are in course of sinking. The vast mineral districts of Flintshire and Denbighshire contain several qualities of coal of a valuable character, and amongst them may be mentioned the Five-yard, the Three-yard, and the Cannel seams, the latter including what is known as the plain and curly, being very rich in oil, and realising a good price at the works where the oil is extracted from it and converted into petroleum, &c. At the present time there are about 64 collieries at work in the northern part of the Principality, producing at the rate of 2,400,000 tons of coal per annum; of that quantity the London and North-Western carries from Flintshire 8000 tons per month. The coal measures, particularly those in Flintshire, in some parts of which there are no less than 15 seams, do not appear to have received that attention which might have been expected in a county where speculation in mineral property has been so general. In vast tracts the coal beds lie entirely undisturbed, whilst under nearly the whole of the basin of the River Dee there are extensive deposits, which at the rate they have been worked will last for some hundreds of years to come. In Denbighshire, also, there are several very valuable seams of coal (the quality being truly excellent for nearly all purposes), one of them being no less than 15 ft. thick. The Ruabon district has long been noted for its coal and collieries, as has also that of Wrexham, close to which town a large concern is now being opened, and which promises to be one of the most extensive in the county, as it will be one of the most complete in every respect. From the new collieries now being opened out, and others projected, during the present year it is expected there will be a large increase in the output of coal in North Wales.

At the Mostyn Colliery, where the men a short time since struck for an advance of wages, matters have been arranged, and work resumed

The colliery is situate on the banks of the Dee, and there are five seams of coal being worked, the output being about 1600 tons per week. It is said that the company are about to erect some blast-furnaces near to the colliery, as there is plenty of ironstone in the locality, with lime at no great distance. There is also some excellent hematite at a distance of eight or nine miles, so that there is every facility for the production of first-class pig-iron. There are, it may be stated, good means for the exportation of produce, there being, in addition to the railway, a place for shipping close to the colliery, where vessels can come to independent of the tide. Adjoining to Mostyn is the Hanmer Colliery, from which a good business is done by rail and water, and where the Five-yard seam is also worked. The firm have recently completed a tramway from the colliery to Llanerchymor Gutter, where the tide comes up, so that they will now have shipping facilities which they have not hitherto enjoyed.

The Battersfield Colliery, which is being sunk at Bagilt, makes little or no progress. The shaft is, probably, the largest in the kingdom, being 20 ft. clear in diameter. As has been previously stated, it is being sunk by pneumatic means, the workmen going down in diving-bell dresses. Work has been suspended for some time, it being necessary to have a new cylinder made to put inside of the outer one, great difficulty having been found in keeping back the shifting sand. That difficulties of no ordinary character have been encountered may be judged from the fact that the present sinking has only reached a depth of 26 or 27 yards (no progress having been made for some time so far as sinking is concerned), at a cost, it is said, of more than as many thousands of pounds. The coal is expected to be reached at the depth of a little more than 200 yards, the seam being that known as the Five-yard, the same as that worked at the Mostyn and Hanmer Collieries.

The Coleshill Colliery, near to Flint, is doing a fair trade, principally by land sale. In the same locality the Flint Marsh Colliery, which has now a line to the Chester and Holyhead Railway, is kept well going, raising at the rate of fully 20,000 tons of coal per year.

In the Mold district most of the collieries are in a healthy state, business generally being at least moderately good. The Bron-Coed Colliery is raising a large tonnage for shipment and by railway, and have put down a line of rails from the pit to the Chester and Mold Railway. At Coed Talon also the Main coal, which is from 6 to 7 ft. thick, is being worked; and a good bed of Cannel, said to be fully 4 ft. thick, is being got. At present they are driving out metal drifts to two other seams—the King coal and the Four-feet bed. The output, now that the effects of the dispute of last year have nearly disappeared, is something considerable. At Coppa the company are doing a good business; besides the main seams of house and steam coal, a good deal of Cannel of a superior quality is being raised. It is said the company are commencing oil extracting, there being extensive works for such quite close to the pits. The Mold Colliery, belonging to a company, is now standing, not having turned out remunerative. It is reported in the locality, however, that business will shortly be resumed at it. A moderate trade is also being done at the Bronwhllfa Colliery.

In the Buckley district there are some 10 or 11 collieries, but all of them are not in work. Mr. Lassey and his partner, who some time since took to the Buckley Colliery, have put down some new machinery, and there is every prospect of the concern turning out a profitable one, more especially as it will be under the able management of Mr. Lassey himself, who now resides near to the pit. A line of rails is about to be put down, so as to have access to the Wrexham and Mold Railway. The South Buckley Colliery, which has been standing for some time, is again at work, and it is expected will soon be in a position to commence more active operations. The workings are being driven out, and a little coal raised, whilst a second shaft is about to be commenced. At Spon Green a steady trade is being done, the coal raised being forwarded by railway, and supplying some of the extensive brick works in the locality, which is noted for its excellent beds of fire and other clay. The Little Mountain Colliery is now kept actively going, the coal being sent by rail, and also for shipment from Connahs Quay, distant about a couple of miles from Queensferry.

The Bistree Colliery, which is standing, is understood to be given up, whilst the Argoed Colliery is also idle, owing, it is said, to a disagreement amongst the shareholders.

In the neighbourhood of Hawarden and at Queensferry the pits are kept fairly going. The Aston Hall Company, who have several pits at Ewloe, the lessor of the minerals being the Prime Minister, Mr. Gladstone, have recently come upon a seam of Cannel of good quality, first having been found about 1 foot thick, but increasing in thickness as the men were driving out. The Three-feet and the Five-feet seams are now being worked, and strong hopes are now entertained that a commencement will be made in the direction of the securing of a dividend, seeing that already upwards of 70,000*l.* have been expended on the works without any return whatever. At Queensferry the pits are now doing a fair business, being well situate for getting on to the Chester and Holyhead Railway.

Although there are scarcely so many collieries in Denbighshire as there are in Flintshire, yet the former county produces the largest quantity of coal, having much better facilities for sending the produce of the pits direct to Chester, &c. It is said the Cae-Penty Colliery is likely to come into the market, some of the partners desiring to retire. The main seam of coal is being worked, being about 6 ft. 6 in. thick, the shaft being only 60 yards deep. At a depth of about 80 yards below the main seam the Ruabon Yard coal, about the best to be found for household purposes, is expected will be found. The railway is within about 300 yards of the pit, so that a branch could be made to join the Great Western, Brymbo, and Trydden line.

Anglesey can now boast of either three or four collieries, the seams being thin, but their production is so limited that they are scarcely worth mentioning, raising only from 7000 to 8000 tons per annum.

In various districts it may be said new pits are now being sunk, so that the tonnage of coal raised in North Wales is certain to increase; and considering the thickness and quality of several of the seams, coal mining cannot fail to be profitable, more especially where the capital is sufficient to secure the most efficient machinery and appliances in the opening out and working of collieries.

MACHINE COAL-CUTTING PICKS.

Sir,—Will you be kind enough to allow me to call the attention of your readers to the last improvements of the pick, as given by Mr. Firth, in his patent, dated March, 1869, wherein he states—

It has hitherto been the custom to work picks with points solid—that is, the point and pick in one piece. This obliges the whole pick to be brought out of the pit to be sharpened whenever blunted. My (Firth's) improvement consists in making a boss on that part of the pick nearest the point, and movable cutters fitted in sockets, secured by cutters or keys.

In April, 1865, Mr. Leatham, in his specification, says—

The nose or point of the pick is made portable, and formed with a wedge-shaped socket, to fit on the arm of the pick, so as to be readily taken off to be sharpened, and another put on.

Mr. Rothery, in his patent of February, 1866, says—

I propose to make the point of the pick or cutter removable, and to secure it in its place by a dovetail and cotter, so that when damaged or required to be sharpened those points may be readily removed and replaced by fresh ones.

Besides these, I believe that moveable cutters, fixed into sockets by cotters and keys, were made and used by Messrs. Ridley and Rothery more than seven years ago. Certainly they did not use any cushions, therefore the only novelty I can see is the India-rubber cushion. —— An Observer.

SAFETY-CAGES OR HOISTS IN COLLIERIES.

Sir,—Having to do business with colliery owners, I sometimes get into conversation with the masters or managers. I am informed that the underground workmen, as a rule, are much opposed to any new invention, or method of working different from that which they have been accustomed to. Now, from what I have heard and read, I believe this to be the truth; but are the workmen the only faulty persons in this respect? I think not: if any of us examine our feelings or actions very closely, we shall often find that we have not cleared the mote out of our own eyes. From what I recollect, it is nearly 30 years since a safety-cage or hoist was invented; yet I find, as a rule, there are very few of them in use, and yet we know there is a considerable loss of life annually from the breaking of ropes, &c. This is not the workmen's fault; it must be that of either the master or manager. I have often enquired at collieries why they did not adopt safety-cages or hoists? Some have said that they had never thought anything about them; others have said that some of them would not act when they were wanted; while some have objected to them because they acted every time the cage went up and down, and, therefore, were continually cutting the guide in pieces.

The first objection is simply negligence; to the second I say they have acted, from what I learn, on many important occasions. But if you have one, and it does not act, it will only be the same as if you had not one; but there is this about it—it may act, and prevent loss of life and property. And if it did not act, you would have the satisfaction of knowing that you had done all you could to save life and property. With regard to the third objection—that it acts too often, and cuts the guide in pieces—that I think is now overcome. I find from an article in the *Mining Journal* of Oct. 9, 1869, that Mr. Callow has invented and patented a safety-hoist, which only acts when the rope breaks, and the cage becomes a falling body. From what I read, it is both safe and certain in its action.

Now, I think that every colliery owner ought to use a safety-cage, and also a detaching apparatus for preventing over-winding.

Ashton-under-Lyne. —— W. Wild.

THE MINERA LEAD MINES, DENBIGHSHIRE.

Sir,—The Minera Mines are situated about five miles from Wrexham. The veins occur in the mountain limestone formation. The old Minera lead mines were commenced about the year 1720, and under different proprietors were worked until the year 1824; they were then abandoned, owing to the increase of water and other difficulties. The mines were re-commenced in 1848 by a new company, who expended about 50,000*l.* in driving the Minera water-level, opening out and exploring fresh ground, which resulted in the discovery of a new lode, and has made the mines since 1853 exceedingly productive and remunerative. The profits have been about 30,000*l.* per year, from that period to the present.

There are 14 pits at the old Minera Mines, from which lead ore and the material mixed with it are drawn. These materials are raised always in vertical shafts, one kibble in each, which is guided by a carrier and two wire-rope conductors. Two principal veins are worked, the levels from the pits being driven, as a rule, every 20 yards in depth. There are four crushers and four dressing-floors, where these operations are performed for the whole of the ores drawn at the pits. At most of the mines blende is associated with lead ore: the separation of these ores is effected with some difficulty, as they approach much nearer in specific gravity than lead ore and the debris mixed with it. The prepared ores are sampled, and sent to different smelters, the highest bidder becoming the purchaser of the ore. Usually the lead ore produces 80 per cent. of lead, and 5 ozs. of silver per ton of lead. About 800 tons of lead ore is prepared per month; Walker, Parker, and Co., of Bagillt, are the principal purchasers; their prices, on March 4, varied from 12*l.* 17s. 6d. to 13*l.* 1s. per ton. The price of blende—which a few years ago was sold at 10s. per ton—on March 4 varied from 2*l.* 18s. to 4*l.* 13s. per ton, the principal purchasers being Dillwyn and Co., Kenrick and Son, and the Bagillt Company also were purchasers. The following are the principal pits from which material is raised:—

The Meadows Pit is oval, 7 by 8 feet, divided by brattice into pump-shaft, 4½ feet, and shaft for raising mineral, 3½ feet; its depth is 260 yards to the lowest level, and there are other levels above. The winding-engine is a 14-in. horizontal cylinder, 3-ft. stroke, on second motion; one kibble and flat wire-rope. The Meadows pumping-engine is of Cornish make, 40-in. cylinder, 9-ft. stroke, 8 ft. in pit, going three strokes per minute; it raises water from the depth of 260 yards to the adit, 98 yards down=162 yards in four bucket lifts, about 41 yards each; the two lower are 8 inches, the two upper lifts 9 inches each. A balance-beam at top; balance-box is weighted with 15 tons. Water is raised from the adit by a small forcing lift, to supply the condenser and for washing the ores. There are dressing-floors at this pit; the winding-engine works the crushers. The lead and blende are first separated from the limestone and other debris by hand-jigging and buddles. The separation of the lead and blende is subsequently made by another process with hand sieves.

Roy's Pit is 7 ft. by 8 ft., 250 yards deep, and is being sunk to the depth of 270 yards; the lodes are worked here from the 160, 180, 200, 220, and 250 yard levels; the lodes run in a direction north 25 west. About 50 tons per day is raised of ore, and other mineral with it. The winding-engine has a 16-in. horizontal cylinder; it pumps also from the 250 to the 220 yard level=30 yards, with an 8-inch bucket-lift; wrought-iron horizontal rod and one T-bob balanced, pump-rods 1 in. in diameter. There are dressing-floors here, crushers worked by winding-engine.

Taylor's Pit, 11 ft. by 8 ft., 270 yards deep, divided by brattice into pump shaft and drawing shaft. The principal pumping-engine (Cornish) is erected here, made at Hayle, 80-in. cylinder, 9-ft. stroke, 8 ft. in pit, goes four strokes per minute. It pumps from the depth of 270 yards up to the adit—108 yards down=162 yards, with four bucket-lifts=41 yards each. The two lower are 15 in., the two upper ones 20 in. diameter each. Water is raised from the adit by a small forcing-lift for the steam-condenser, and for washing the ores. A balance-beam on the surface, the balance-box is weighted with 25 tons. The winding-engine is a 14-in. horizontal cylinder, the ore is got from two lodes and from several levels. The principal dressing-floors are near this pit; what mineral is drawn at Taylor's, as well as several other pits, is crushed and dressed here.

Lloyd's Pit.—At this pit a 14-in. horizontal winding-engine is used only for men to descend and ascend. The pit is fitted with wood conductors, one cage, and flat-wire rope. Three shifts of men are employed, the changing times being 6 A.M, 2 and 10 P.M.

St. Andrew's and Ellerton Pits, 200 and 170 yards deep respectively; these are near together. One 14-in. horizontal winding-engine raises the material from both pits; about 50 tons got per day from several levels of mixed mineral. The same engine works the crushers, and there are dressing-floors here.

Reed's Pit.—One 14-in. horizontal winding-engine raises the material from this pit.

Royle's and Busy-Bee Pits.—One 14-in. horizontal engine raises material from each of these, which are near together. There are six other pits from which stuff is drawn, varying in depth from 80 to 170 yards; these are named the Grand Turk, Boundary, Cornish, Davis, Morgan, and Maes-y-Folan pits. A horse-whim is used at each of these for raising the minerals. In the Minera district several other mining companies have established works; the principal of these are Minera North, Minera South, Minera East, Union, Central, Boundary, the Park, and Pool Park. Some of these have been successful to a limited degree. The aggregate produce of the whole of these does not approach the produce of the old Minera Mines in lead ore and blende.

THE MINERA LIME COMPANY'S WORKS.

This company's very extensive quarrying works are in operation in the upper part of the mountain limestone formation. This limestone is almost destitute of fossil remains, and from its extraordinary purity, containing only a trace of phosphorus, and a small percentage of sulphur, and by analysis 98 per cent. of lime, it is well adapted for iron smelting and the purification of gas. This lime is also extensively used for chemical works, for building, plastering, and agricultural purposes. A large proportion of the produce of the quarries is calcined at the place. The company employ about 150 men, and have within the last two years expended in improvements about 15,000*l.* About two-thirds of this expenditure has been made in the erection of a new calcining kiln, on the principle of Hoffmann and Licht's patent. The lime as produced in the new kiln is more thoroughly calcined than in the old system of burning in open kilns. The new kiln has also the advantage of producing lime of larger size, and free from cinder and dirt, which has caused an extended demand to arise for it, with a saving of 50 per cent. in fuel as compared with the old kilns; but the labour in packing the limestone, and attendance to the burning day and night, is found to be increased.

The Hoffman kiln, built at Minera quarry, is a double kiln, of the oblong form. Though the chambers are continuous all round, yet the whole are worked as two distinct kilns. There are 24 chambers, 21 by 18 ft. wide, and 9 ft. high; each of these communicates by two flues (furnished with a valve) with the main central flue, which is built between the arched chambers. To cause a sufficient draught through the great body of packed limestone, both in the cooling state and under calcination, a chimney 224 ft. 6 in. high is built from the main flue, one advantage of the system being that the heat from the fuel is so fully absorbed by the burning lime that the gases escape at a low temperature into the main flue and chimney. Each chamber can be disconnected from the other chambers by an iron movable door, which is placed at one end of the chamber being charged with limestone, the chamber adjoining at one side receiving the last of the heat from the fuel, and that only is open to the main flue. In that adjoining on the other side the limestone (calcined) is being withdrawn; the air for the support of combustion entering through this chamber gradually cools the lime, and, being itself heated as it passes through the calcined stone in four chambers, until it arrives at the point where the fuel is being supplied. There are thus twelve chambers in connection where the several processes are carried forward—one chamber being charged with limestone, one adjoining to it where the calcined lime is withdrawn; this and the three chambers further on contain the materials in process of cooling by the passage of air through them; the next six chambers contain limestone under the action of the fuel, the fuel being supplied at the seventh chamber through holes at the top; the combustion thus excited gradually diminishes in intensity until it reaches the twelfth chamber, where the heat escapes into the main flue. Small spaces are left in the packed limestone for the fuel to fall into from the holes at the top. It is found with using clean slack no clinker or cinder is left after calcination, the only part of the fuel unconsumed is the ashes. These processes are advanced the length of one chamber every 24 hours; and the same processes are carried forward in the other twelve chambers, so that they are in operation at two points in a perpetual round in the arched passage.

The admirable principles of Hoffmann's kiln have been as successfully adopted for burning bricks as for lime. It will be observed that economy of fuel is secured by supplying air for the support of combustion at a high temperature, this being effected in its passage through the cooling chambers; next, the gaseous products of combustion pass through the six chambers where the limestone is being calcined, at first with the greatest intensity, the heat being absorbed gradually by the material until the raw stone is reached, and the gases escape into the main flue at a very low temperature, comparatively to what it would be if only one or two chambers had been traversed, so that a small addition of fuel is afterwards required in the latter to complete the calcination. From this kiln 100 tons of lime per day can be produced, and this large supply can regularly be depended on. Not the least of the advantages connected with it is the absence of all smoke, consequent upon the entire combustion of the fuel.

The Minera Lime Company have two of Blake's stone-crushers in operation, driven by one horizontal engine; and one crusher on a different principle, driven by a small engine. The limestone is crushed into small pieces for chemical works, or into larger for macadamising roads and for smelting purposes; it is also ground to dust for glass works. A large mortar mill is also erected, from which mortar is manufactured ready for use. —— C. V.

THE SHROPSHIRE LEAD MINING DISTRICT.

Sir,—This district is situated about 10 miles west of Shrewsbury; its length from north-east to south-west is about four miles, with a breadth varying from one to two miles. At one extremity is the well-known Snailbeach Mine, at the other the White Grit, not now working. The formation of the district is the Lower Silurian, accompanied by intrusive masses of greenstone and extensive deposits of shale, which last generally coincide with the valleys and minor depressions. Each of these cut off the lodes, but are probably the chief causes of their rich bunches of ore. On the south we find the Cambrian formation, near Church Stretton, rising to a considerable height in the bold ridge of the Longmynd, presenting very abrupt and somewhat gloomy scenery. The writer is not aware whether any mineral veins are found in the Cambrians. To the north and west lie the Upper Silurians, and on the east the coal measures set in. The district, it will be seen, is somewhat limited in extent, but, on the other hand, the lodes are productive to a great depth—as much as 200 fms. in the Old Bog and Snailbeach. Very fine bunches of ore are found in the lodes, especially when these approach the greenstone or shale. The writer well remembers, some few years ago, seeing a splendid stope, worth 10 or 12 tons to the fathom, in the 80, at the Round Hill Mine, which was then working a little to the north of the Oven Pipe, and to re-open which would be a fair speculation. These intrusive masses of greenstone and shale are somewhat puzzling to the Cornish miner, "who between the two," as a writer in the Journal once observed, "has a troubled time of it." The best accounts of the district known to the writer are to be found in Murchison's "Siluria," and another excellent description written, he thinks, by Mr. H. C. Salmon, which appeared a few years ago in the columns of the *Mining Journal*.

—— J. B.

MINING INDICATIONS—DEVON GREAT CONSOLS.

Sir,—Mr. Ennor, in the Supplement to last week's Journal, would seem to be rather unfavourably impressed with the practical knowledge of modern mine reporters, and he refers them to the experience of his own father by way of a guide. He says—

I remember when a boy I was passing with father near Capel Tor Mine, close by which we met Hitchins and Brenton—the great guns of the day. In their conversation with my father, he remarked that the stuff drawn from Capel Tor Mine indicated but little promise for the future. He then pointed out the old gossan burrow, a little distance off, as a far more promising spot, when old Mr. Hitchins asked if he did not know the old adage—"Where it is, there it is?" The old gossan burrow named is now known as the Devon Great Consols.

As one interested in mining, perhaps I may be allowed to remark that Devon Great Consols, as is universally known, was discovered by Mr. Josiah Hitchins, son of the Mr. Hitchins referred to, and Mr. Ennor will be surprised to learn that there is at this moment a course of ore within 300 ft. of the old Capel Tor shaft on the same Capel Tor lode, in West Maria and Fortescue, worth 100*l.* per fathom.

Tavistock, March 22. —— A. B. C.

SLATE AND SLAB QUARRIES IN NORTH WALES.

Sir,—I was pleased to notice in the *Mining Journal*, a week or two ago, an account of the way in which Slate and Slab Quarries are worked in the neighbourhood of Llangollen. Since reading that article I have made a sort of tour over the slate and slab ranges of an adjoining district. Being at Corwen, which I believe is something like 12 or 13 miles from Llangollen, I learnt that there were two quarries within a very short distance of the village—the one about a mile the other 2½ miles east of Corwen.

There seemed to be quite a stir about one of these quarries; it was said that certain parties in the district had sold their interest in it for a large amount in cash and shares, and that a company was about to expend a large capital in order to construct a railway to the quary, and thereby join the Great Western at Glandyfrdwy Station. If reports be true, 20,000*l.* is to be forthcoming at once to carry out this work, and develope the quarry, &c. Supposing it to be all true, I do not much wonder at the tradespeople of the locality feeling delighted at the prospect of an influx of grain to their mill, especially as there is nothing in the shape of public works in the neighbourhood to bring or keep alive business commensurate with the increase of goods, vendors, &c. Next morning, after doing fair duty at the breakfast-table, I thought, being much interested in slate and slab concerns, that I would pay a visit to each of the quarries, so that I might gain a further knowledge of the actual merits of the properties.

No. 1.—A *Slate Vein*, I found to be fully two miles from Corwen. This property seems to be worked by a gentleman residing in Denbigh, and I was informed by the manager (who, by the way, seemed to be a straightforward, pushing fellow) that the quarry was commenced about three years ago, and that a large quantity of slates had already been sold. The dip of the rock, together with the foot-joints, are the most favourable for working that I have ever seen. In fact, were it not that the rock to a large extent lacks the quality of flexibility it would be one of the best paying concerns in North Wales.

I now proceed to No. 2 *(Slab Quarry)*, only asking which course I had better take. After travelling some three miles in the direction of the quarry I saw a long way off a small heap of rubbish on the western side of a round-shaped hill, and by the time I had made the whole distance I concluded that I was fully seven miles from Corwen; this was rather to much of the "fox and tail." I found that two openings had been made on the side of the hill, and that there were many large slabs, or rather flags, on the pile of debris outside. The

flags of stone opened upon are very large, but on account of the foreign matter contained in them I should think buyers will be slow to purchase, as they cannot be easily converted. I should say that it would be even difficult to cut them with a circular saw. This being the case, merchants will only buy them at the price paid for ordinary flagging. If this be found to be so, I much fear that the tradespeople of the district will not, after all, profit much by the new state of things.

Carnarvon, March 23. T. B. ROBERTS.

THE CAPE COPPER MINES.

SIR,—A letter from "Index," upon the Copper Trade, in last week's Journal, alludes to the brilliant results which have been obtained from the Cape Copper Mines as the only cheering point in the production of copper, but he doubts if these mines are not too rich to last. He also states that all the surrounding country has been tried, and to no purpose. The reports published from time to time in the Journal show that the reserves at the principal mine of Ookiep are sufficient to maintain the present rate of production for many years to come, and that as the workings reach a greater depth the mine continues equally productive in the present and promising for the future. Up to the present moment there is no indication whatever of the mine failing, but entirely the reverse. The Journal of Feb. 26 states that Capt. Williams has "never seen the mines looking so well as they are at present, or so likely to continue;" and under the same date the superintendent reports that at Ookiep "some 7 fms. of magnificent ore ground have already been laid bare east of the flookan course," a point at which it had been thought possible by some that the ore might be cut off in that direction.

Spectakel appeared at one time as if the deposit has been only superficial, and was exhausted, but the mine has now literally broken out in a fresh place. The agents, following down an indication at a point in the old mine called Arend's pitch, are reported in the Journal of Feb. 26 as having come upon a mass of ore, where they had "as yet found no end to the ore ground, in either end, back, bottom, or sides." It seems probable that the ore hitherto raised from this mine has been merely a bunch, though a very large one, formed by the junction at surface of two mineral courses, and that the ore at Arend's pitch is the commencement upon the north mineral course of what will prove to be the real mine, properly so called. It is by no means unlikely that the other mines may prove to be of the same character, in which case the company's mine of Springbok, which was the first worked in Namaqualand, and one of the richest yet discovered, though now abandoned, may be re-opened advantageously. The agent states of the Spectakel Mine, as reported in the Journal of March 5, that at the bottom of the 27 fm. (or deepest) level he is sinking in ground "that will yield from 5 to 6 tons of copper ore per fathom, which is improving in depth every sink we make. I have much pleasure in being able to say I have never seen the mine looking better. I have no doubt but that it will be a good and profitable one for many years to come." The succeeding reports from this mine will probably be very interesting and important: the ore obtained from it is very rich, averaging about 40 per cent. of copper.

The deposits at the Cape Copper Company's mines are, probably, unique in their extent, their richness, and the low cost at which ore of a very high percentage can be raised. The true value of this property will only be developed when the improved communication with the coast by means of a tramway, now in course of construction, shall have been brought into operation.

The remark made by "Index," that all the surrounding country has been searched, but to no purpose, is inaccurate. The country is full of indications of the greatest promise, some of the most important of which are upon the property of the Cape Copper Company. Your Journal of March 12 contains an extract from the superintendent, stating that "The sample of blue ore from Koperberg (or copper mountain), referred to in my last letter, is a portion of a very fine branch of ore discovered in driving a level east of shaft, to which the adit level has been driven. It began some 2 fms. east of a flookan course, and is in close conjunction with a run containing native copper. Other specimens, equally rich and promising, have been forwarded from the mines to-day." So far as the operations of the Cape Copper Company are concerned, Koperberg is an entirely new mine, but it has been known ever since the country was first settled in by the Dutch, and its indications are the most extensive and remarkable in Namaqualand, extending more or less continuously for some miles in length, and spreading over a very large area of ground.

The indications at Nababeep are also described as presenting a remarkable and most imposing appearance. It is now being worked by the company, with every prospect of its shortly proving to be a highly profitable mine. The company are also making trials at Modderfontein, and there are numerous other mining centres which would be of infinite value here, and which will doubtless be worked in time. It would appear, therefore, that "Index" must not rely upon the price of copper being influenced upwards by any falling off in the supply from the Cape, which possesses some of the richest mining districts in the world, and which are as yet comparatively untried. It scarcely admits of a doubt that copper cannot always remain at its present exceptionally low price. It will recover to some extent with other produce, when trade generally becomes more profitable, and when that cheerful confidence is re-established which so largely influences the price of everything.

People talk of the enormous imports from Chili as being the cause of the low price, but the statistics show that our consumption has kept pace with the supply. Low prices must continue to increase consumption, and builders will, doubtless, soon find out that it is cheaper to cover a flat with copper, weighing 1 lb. to the square foot, and costing 8d., than with lead weighing 5 lbs. to the square foot, and costing 10d., especially as copper is so much the more durable metal. Perhaps, too, as more copper is imported in the form of metal and less as ore, the capricious action of the smelters may have less power to depress prices. The future of copper is, therefore, by no means without hope; and should the Chili miners some day find that they can no longer afford to continue to lose money, as it is alleged that they are now doing, the price of copper will rule high, in the face of a diminished supply and a daily increasing demand.

AN ORIGINAL SHAREHOLDER OF THE CAPE COPPER COMPANY.

COPPER MINING ON LAKE SUPERIOR.

SIR,—Through the continued depressed state of copper mining this district is almost at a stand-still. Some fifteen years ago there were hopes of the time coming when the mines here would flourish and go a-head of all other mining districts known. This was to be when the country would be cleared up, roads made from the harbour to the different mines, accommodation made for men, merchants settled here to supply men instead of the mining companies, Saut Ste. Marie ship canal made, to reduce price of freight, &c., and, perhaps, a percentage off the labourer. All this, except the last, is effected. Freight is down from $15 to $6 and $8 from Ontonagon to Detriot; hauling mineral from the mines to Ontonagon and supplies back can be effected from $3 to $4 per ton, which formerly cost from $10 to $20 in summer, and from $6 to $8 in winter, so that there is now an excellent opportunity, with the exercise of ordinary judgment, for the profitable employment of capital. Thousands and tens of thousands of dollars were thrown away in the most absurd kind of machinery, to serve in place of stamps, for pulverising the copper work, and washing the same. Capitalists, consequently, got sick and disgusted with paying assessments before the mines could be brought into paying condition. Prices of provisions and clothing are much higher than before the rebellion, which keep up wages. The present rates are—Miners, $45 to $50 a month; labourers, $38 to $40 a month; carpenters, $2½ to $3 a day; smiths, $2½ to $3; chopping wood by the cord, $1; engine-men, $50 to $55 a month.

Calumet, Hecla, Quincy, and Central Mines are the only ones on the Lake creating any good feeling. There are a few others about meeting cost, yet can hardly be considered in a fair shape of mining. I hope soon to visit the Calumet and Hecla, when you shall have a description of my visit.

I am told the Messrs. Taylor are going to send out a man to inspect the Perrys and Delaware Mines, located about four miles from Eagle Harbour, with a view of purchasing them. I have been there, but not underground. Both mines are well supplied with machinery—hoisting-engines, rock-breakers, and stamps. Eagle Harbour is all right for landing freight, and a good road to the mines. I should like very much to see English capitalists secure a good property here to work. There are concerns which, if worked to advantage, would make good paying mines. For instance, the Bohemian Mine, close by, which I have had my eye upon ever since I have been here. There is a hoisting-engine ready to work, with tramroads to bottom of shaft. Two shafts are sunk, and connect two levels below adit; total depth of one shaft about 150 ft., the other about 200 ft. Plenty of good houses for the men and officers, and a good 12-heads of Gates's stamps ready to run, situated about half-a-mile from the mine. The coming water in the mine is of but little disadvantage, say 20 cars, or 2000 gallons, in 24 hours; the lode is from 6 to 20 ft. wide, and charged with copper throughout. There has not been a practical miner to handle it yet. Nothing but teamsters and lawyers, and those men but seldom choose able mining captains, fearing a good captain might win favour, and throw them out of their situations. There is a large quantity of woodland belonging to the company for all purposes, and I think the whole plant and machinery could be had for $200,000, or perhaps $100,000 to $110,000. The company resides in Philadelphia. After draining the water, which would take (say) a month, a profit of 20 per cent. could be made, right straight along. With from 20 to 50 miners to start, I would engage to undertake the management for one, two, or three years, and make that profit, or ask no salary.

I know of two other locations here well worthy of attention—Great Western and Mass Mine. Those mines have houses for men, but no machinery. Each of them would require a stamps and hoisting engine. They are simply down 60 to 80 ft.; water very little, to which I may refer in a future letter. HENRY BUZZO.

Greenland, Michigan, Feb. 28.

THE GOLD FIELDS OF NOVA SCOTIA.

SIR,—Under the signature of "Acadiensis" I notice, in the Journal of Jan. 1, a letter from "the Gold Fields of Nova Scotia." As that letter contains a covert attack upon the Leader of the Government, and is otherwise calculated to mislead the public, you will oblige by allowing me to explain.

The late much-mismanaged "Nova Scotia Gold Crushing and Amalgamating Company (Limited) was organised upon the recommendation of Mr. John Arthur Phillips, F.G.S., &c., the leading spirit and responsible manager being Mr. Arthur M'Nutt Wier. The Hon. William Annand, then Financial Secretary of Nova Scotia, was nominated a director without prior consultation; but, believing in the honesty of the enterprise, and that it would greatly benefit his native province, he consented to become a local manager and financial agent to the company. The salary attached to the office was moderate, as, in the event of the company continuing operations, he would have been obliged to resign an official appointment of equal value. It is worthy of remark that the few properties purchased by the company upon this gentleman's recommendation have since, under ordinary prudent management, proved highly remunerative to their new proprietors.

After the above explanation, justly due to the hon. gentleman, I will now briefly explain why the company so speedily came to grief, at a loss of over 30,000*l.*

1.—By a monstrous outlay of over 10,000*l.* (but little of which found its way into the pockets of original owners) for lands, purchased upon the assumption that a city, phœnix like, would spring from the debris of undeveloped mines in the neighbourhood.

2.—The erection of expensive steam crushing-mills before there was a supply of auriferous quartz to crush.

3.—The importation of machinery unsuited to the works, of miners at double the wages of other men obtainable in the province, and, to crown all, of a mining captain of questionable competence for that position.

Finally, 5000*l.* promotion money, salaried directors out of capital, heavy travelling and incidental expenses, capped, of course, by superfluous engineers, clerks, and an expensive establishment in London.

Not one-fifth of the money subscribed was expended in legitimate mining, and thus the company, whose success was made impossible through mismanagement, has ever since been an incubus upon the value of Nova Scotia gold fields in the London market.

It is to correct such false impressions that the Government have determined to regularly forward to your valuable Journal a brief summary of monthly returns, officially verified—the one for January, 1870, being now enclosed. VERITAS.

Statement showing the quantity of Quartz crushed and Gold obtained from the several districts in Nova Scotia during January, 1870:—

District.	Mine.	Tons.		Ozs.
Montagu	Leckies	63	....	99
Musquodoboit	Leopold and Hyde	90	....	32
Oldham	Sterling	251	....	152
Renfrew	Several	230	....	60
Stonnart	Gisborne	5¼	....	34*
,,	Allen's	3	....	2
Sherbrooke	Palmerston	67	....	59
,,	Wellington	575	....	312
,,	Dominion	330	....	127
,,	Sherbrooke G. M. Co.	84	....	138
,,	West	28	....	38
,,	Chicago	108	....	48
,,	Other small mines	94	....	53
Tangier	Strawberry Hill	75	....	130
,,	Other small mines	22	....	41
Unlacke	Unlacke	55	....	40
,,	Montreal	75	....	33
,,	Small mines	13	....	8
Wine Harbour	El Dorado	21	....	13
,,	Sutherland	3½	....	½
Waverley	Bürkner	170	....	76
Returns for January	American Hill	177	....	86
Not in December returns, give as enumerated	Lake Major and Rock Head	68	....	8
Total		2407	....	1630½

JOHN KELLY, Deputy Commissioner.

* This amount was from the first crushing.

GRAVEL AND QUARTZ MINING IN GRASS VALLEY.

SIR,—Since my last communication to the *Mining Journal* I have visited the Red Dog and You Bet Gravel Claims, situated near Greenhorn river, distance some nine miles from Grass Valley. All the tailings and debris from the neighbouring claims are being carried into the above-named river, and in some places it has accumulated to the depth of 40 ft. Upwards of $2,000,000 is supposed to be laying on the bed of this ancient river, and efforts have been made to "flume" its waters, but owing to bad management $25,000 was spent, and nothing accomplished, so, probably, the supposed amount of gold may continue to increase for years to come. I was proud to see the showing of the Red Dog and You Bet claims; they are astonishingly rich, and paying large dividends. The Buckeye claim, the property of the Pacific Mining Company, is doing well; the clean-up for 26 days amounted to more than $15,000. Any attempt on my part to figure up the value of this property would be fruitless. Like the Van Mine, in Wales, we must leave Father Time to solve the problem. Some few days since an exceedingly rich discovery was made on Randolph Flat, some three miles west of Grass Valley; the gravel already washed paid, according to close calculation, $10 to the square foot. This result caused quite an excitement, and prospecting for the same lead is being carried on with great spirit and activity.

Our Quartz Mines are looking well, and improving in value. The Eureka Mine, with a 30-stamp mill, have cleaned up as high as $14,000 in six days' run. The Greenhorn Mine, with an 8-stamp mill, cleaned up over $7000, exclusive of specimens, in 22 days' run, at a mining cost not exceeding $900. As this is a young, promising mine greater results are anticipated as operations progress. The prospects at Union Hill continue to brighten. The mine throughout is looking splendid, particularly so in the bottom, where a decided improvement has taken place, and the lode looks well. Long and continuous dividends may be expected from this valuable property. Recent developments on the Grass Valley Consolidated Mine has created great excitement; 51 tons of quartz taken from the lode produced $6993, with a specimen of 5½ ozs., which makes the yield over $7000. This mine was sold some two years ago to a company in London. There is no doubt but what this is a valuable property, as it is situated to the east of Eureka and Idaho, and evidently on the same lode. When the 20-stamp mill arranged for is erected, and in operation, the shareholders may expect profitable returns. This country offers great inducements for capital, when by a careful selection and judicious management success will be certain, and like other dividend mines in this locality capitalists will receive good percentage for capital invested.—*Grass Valley, California, March 5.* THOS. FAULL.

ON MINING, AND THE MINERAL RESOURCES OF COLORADO.

SIR,—I again avail myself of the opportunity of writing to your valuable Journal respecting the mineral wealth of Colorado. It is now about ten years ago that the white men first put their feet on this rich, undeveloped country, for the purpose of gulch mining, and which first commenced at the bottom of North Clear Creak, about four miles south of the town of Black Hawk, and six miles from Central City. In the course of operations quartz lodes were first discovered. The first discovered in these mountains was the Gregory lode, in 1861, about a quarter of a mile north-west of Black Hawk, by a man named Gregory. Operations were at once commenced on it, and have continued up to the present time. It is a strong, masterly lode, bearing east and west, and has paid large profits to the proprietors. The first mine was the Black Hawk, owned by some gentlemen of New York. Soon after mining operations commenced, capital being required for the erection of a 60-head stamp mill and other necessary machinery, the mine was mortgaged for the sum of $260,000, at the rate of 8 per cent per month. That is the way in which many mines have been carried on in this country, and unless they are vastly rich how could they pay under such circumstances? This mine is sunk to the depth of 600 feet, and the deeper they sink the richer they find the ore. It produces a large quantity of smelting ores, not only rich in gold and silver, but of a high percentage for copper. These ores are sold to Prof. Hill, the smelter, and the second quality ore is treated in the stamps mill. West of this mine, on the same lode, is the Consolidated Gregory Mine; on the east, also on the same lode, and adjoining the Black Hawk, is the Briggs Mine; east, and adjoining the Brigs, is the Smith and Parmatu Mine. Each of these mines is producing rich ores, and paying large profits. Had they been in the hands of English capitalists, where they have paid $1000 to their present proprietors they would have paid double that amount. The ores are of precisely the same character as all the rich lodes throughout this country.

As to the quality of the ores from this lode, I refer you to a letter from Mr. Cope, of Bartholomew House, which appeared in the London *Mining Journal* of Dec. 11, p. 929, respecting 20 tons of ore sent from the Smith and Parmatu to England, which yielded 9½ ozs. of gold, 26 to 28 ozs. of silver to the ton, and 9½ per cent. for copper. I am informed by the agent of this mine that the same quality ore as sent by them to England has been selling to Prof. Hill for $100 per ton. Now, look at the profit he makes on 20 tons of ore.

The greater part of the lodes opened up in Colorado produce large quantities of the same class ore as those purchased by Prof. Hill, who can consume only a small quantity in his small furnaces. These he procures at his own price, as there is no opposition to him. There are thousands of tons of very rich ores here already discovered, and no market for them. Prof. Hill is now preparing to erect additional furnaces, for the purpose, in my opinion, of detering English capitalists from erecting furnaces. He may well make every effort he possibly can to prevent other parties from erecting furnaces in Colorado, but I hope the time will soon come when there will be opposition to him. I feel justified in saying that if fifty furnaces were erected in Colorado it would not be a speculation, but a safe investment for capital. If there are any persons who wish for information on this subject, by correspondence or in person, I will cheerfully give them all the information that I possibly can. Until English capital is introduced into the country Colorado will remain in her present undeveloped condition. In my opinion it is one of the richest countries in the world, but with insufficient capital in itself to develope it. Abounding on all sides with the richest lodes of all kinds—gold, silver, copper, lead and blende, of which an unlimited quantity can be raised at a small cost—there are, doubtless, some persons who will wonder why such a country should be so neglected; and this I feel it my duty to explain. About the early part of 1864 there was a rush to these mountains by parties from New York, Boston, and Philadelphia, buying up mining properties at extravagant prices. When operations were commenced, the agents who were sent here knowing nothing of mining—indeed they were all to be found at the billiard rooms, and smoking cigars—large amounts of capital were expended in erecting large buildings, and putting up new machinery of different kinds for the purposes of amalgamating the gold, but all of which proved failures. Many of them have been furnished at great expense with first-class machinery, which was never used. Thousands of pounds worth of machinery, such as engines, &c., was sent there from the States, at that time at great expense, owing to the railroad not being opened, when the nearest ports for transport to the Colorado mines was either Omalia, Nebraska, Aitchison, or Kansas, 650 miles land carriage, at the enormous freight of 25 c. per lb. Thousands of pounds worth of machinery is now lying about these mountains, that has never been put to use, and can now be bought at almost old iron price.

This is the way money has been expended in Colorado. Such extravagant transactions have brought the mines to grief, and the entire district to a state of bankruptcy. To prove that the county is as rich as I have oftentimes represented it in my letters to the Journal, I now append in figures a correct account, in currency, of the gold shipments from Central City during the last twelve months, and all produced in a small area of three miles long and one wide:—

January	$104,500	August	$215,000
February	115,500	September	165,000
March	133,500	October	143,875
April	145,000	November	150,500
May	161,500	December	130,000
June	203,000		
July	168,600	Total	$1,835,975

This shipment was made by three banks here, and does not include the matt sent by Prof. Hill, which is estimated at the value of *four hundred thousand dollars* for the year; nor does it include the amount sent through private sources. Had these mines been in the hands of English capitalists three times that amount could have been returned.

In regard to smelting ores that these lodes contain I have named it to miners respecting England being the best market for them: in reply, they ask how long it will be from the time of sending the ores from here before they will be paid for them. When they are told three months, they say that they get paid ten or twelve times during that period. There are a number of lodes laid open by miners that contain large quantities of smelting ores, and no market here for them. When that class ores that contain much copper or lead are sent to a stamps mill they cannot be worked to advantage to the miner, as the stamps mills now in operation do not save one-half of the gold contents.

I now give you a correct statement of 31 assays of tailings, made recently by Mr. Schultze. These tailings came from the stamps mill here, and run into the gulch. Also 14 different assays of the same tailings, made by Mr. Burlingame. These gentlemen are practical assayers here. The average of these 45 assays was $27 86 c. per ton. I also give you a correct statement of 12 assays of concentrated tailings, made by Mr. Schultz, which average $67 19 c. per ton. And 11 assays by Mr. Burlingame, averaged $69 27 c. per ton. By these figures you will see that Colorado is a rich mining country. To work the mines here to the best advantage, and in the most economical manner, it would require capital. What I can recommend as a safe investment in this country is the erection of blast-furnaces and some different methods of stamping the ores. In my opinion, if stamps on the same principle as those in California were erected here they would be found far superior to those we now have at work. Those in this country are precisely on the same principle as those used in Cornwall for stamping tin ores, with five heads in a cover in the front of the stamps. About 4 ft. apart three tables are fixed, one for each cover, from 7 to 9 feet long. These tables are covered with copper plates, which are covered with quicksilver, for the purpose of accumulating the gold. These tables are precisely the same as those in use at the tin mines in Cornwall for

washing tin slimes. The water, sand, and quartz pass from the stamps over these plates. What goes over the plates runs into the gulch, and is washed away as tailings. Therefore, I consider that mining and stamping are conducted in a very loose way in Colorado.

The mines in the Nevada district, about one mile from Central City, are attracting attention here: they are paying well. Second quality ores, in the greater part of the mines, are yielding under the stamps equal to 2 ozs. of gold to the ton. The Flack Mine, in the Flack Mountain, is producing the richest ore of any mine now in operation in Colorado, the second quality yielding over 2 ozs. to the ton of ore. The smelting ores are sold to Prof. Hill at from $175 to $250 per ton. The Flack Mine is about 400 ft. deep. A parallel lode to the Baker, and only 80 ft. apart from that lode, yields ores of precisely the same character as those of the Flack, and when further developed I have not the least doubt but that the Baker Mine will be found to be of equal value to any mine in Colorado. It is reported here that an English company is about to take to the Baker Mine, and if so, and if judiciously managed, the mine will not be a speculation, but a safe investment, and the company will be well remunerated. As I do not like to occupy a greater space in your valuable Journal this week, I defer the remainder of my correspondence respecting silver mining in Colorado. THOS. JENNINGS.

Central City, Colorado, Feb. 26.

MINING IN COLORADO.

SIR,—Since my last communication to the Journal I have examined several valuable mines in this country, to one of which I will devote a portion of this communication. This is known as the Germon Mine, and consists of six or more hundred feet on the lode of that name. It is laid open by three shafts, the deepest of which is only about 250 ft. About 400 ft. only of the ground has as yet been worked to any extent. The yield has been very fine. Near the surface the gossan was found to be rich in free gold, which was saved by washing in sluices. The vein is 6 ft. average width, containing about 5 ft. of paying ore. Between 2 ft. and 3 ft. of this is copper pyrites, which yields in smelting 17 per cent. copper, and from $80 to $100 in gold per ton. The remainder of the vein is composed chiefly of mundic, and yields under stamps from 1 oz. to 4 ozs. in gold. This mine is owned by one person (the discoverer), and is worked entirely by individual enterprise, employing at no time more than ten men, and much of the time only from three to five. No machinery has been erected on the mine for hoisting ore, except the ordinary horse-whim. The total yield of the mine in three years is $155,000. Although there has been little said with regard to this mine here, the yield has been uniform and steady, and I regard it as one of the best mines in the country; and, for the amount of work done, the yield is quite equal to any. If this mine were in the hands of a good English company, with their skill and economy of management, it could be made to yield a large amount of money, and would return in two years in profits the money for which it could be purchased to-day. Mining prospects in this country are in a more healthy and hopeful condition than ever before, and the coming season is looked forward to with a great deal of encouragement by all classes. The railroad will in a few months be completed to within 25 miles of this point. Already it has had the effect to cheapen the prices of living, and, in the same ratio, the prices of mining material and labour. The shortness of the time required to accomplish the journey to this country, and the ease with which it can be made, are causing many persons to visit and examine our mines personally. The entire journey from New York city to this place can be made in less than one week, and in the most comfortable manner. It is to be hoped that many of our English capitalists will visit Colorado either in person or by their agents during the coming summer. JESSE ARCHIBALD.

Central City, Gilpin County, Colorado, Feb. 26.

AUSTRALIAN UNITED GOLD MINING COMPANY.

SIR,—The full significance of the Telegram just received from this mine, which is undoubtedly authentic ("Central bottomed very rich"), cannot be fully understood until it is known that for the first time in the Castlemaine district, Victoria, the bottom of the ancient alluvial stream has been touched, and found "very rich." If it is anything like the Ballarat "alluvials" in richness of gold, the Australian United Company may congratulate their shareholders on having a prize indeed. This "bottoming" is what Mr. Kitto alludes to in his letter of Feb. 1, received by this mail—"The indications here are very promising, and the public are on the tiptoe of expectation, seeing that our success at the Central Mine will open an immense field, capable of employing thousands of persons." The Telegram must be March 1.

March 24. S.

THE TUOLUMNE GOLD MINING COMPANY.

SIR,—I am glad to see that a company is about starting to work the Grizly's Mine, in the county Tuolumne, in the State of California. During the year 1866 I spent much time in the district in which the mine is situated, and I saw sufficient to convince me that the property was exceedingly valuable. Worked by men with no capital, and in the unminer-like manner peculiar to parts of this country, it nevertheless paid handsomely, the owners leaving it for awhile whilst they gambled away the profits they had made, and returning to it again for a fresh supply, to enable them to continue the same reckless sort of life. The large amount of gold obtained in less than 200 ft. from the surface will be found duly recorded in the books of the public carriers at San Francisco. I shall be glad to see that the company is formed, and has taken possession of the mine, and I shall watch with much interest the progress of the undertaking, for I am quite satisfied that with careful and honest management there can be but one opinion as to the result—that it will be highly successful.

43, *Tredegar-square, Bow, E., March* 24. G. CLINK.

RHENISH CONSOLIDATED MINING COMPANY.

SIR,—The annual meeting of this company is, I hear, to take place on March 31, and being somewhat interested therein, may I beg the insertion of the following remarks? The non-success hitherto of this undertaking has been much regretted by more than those holding shares in it—those having mines in Prussia had hoped to see the value of their property enhanced, and legitimately attracting the notice of English capitalists, by the profitable development of the Rhenish mines. The straightforward statements made every month are much to be commended, although showing that the mines just fail of paying cost by only 10*l.* or 20*l.* It is to be hoped that this little hiatus, *valde deflendus*, may attract the special notice of the meeting, and steps be taken accordingly. The promise held out, too, in the prospectus has not been adhered to: the success *is dependent* on one mine only. The Fahrenberg has been given up, the James Watt also. But what trial have they had? In the latter, according to the reports, only sufficient to prove that it more capital had been put in there would have been a success, as I see by a circular sent me that 750*l.* worth of ore was obtained from a level only 10 fms. deep, and which had been stoped by the old workers to within 3 fms. of surface; but there was only a 4-horse engine to overcome the water, so the water conquered, and money and time were lost. What has the present mine, or rather two in one, both being upon one ore-bearing lode, given? (See report, 1868.) It has given them in three years about 10,000*l.* Your readers will ask, What is the depth? &c. I am told only 20 fms. at one and 10 at the other; and the report of 1868 says, "Pittar's sink gives 3 to 4 tons of silver ore per lachter:" that the expenditure, exclusive of block, had been 3846*l.*, of which 2602*l.* had been met by proceeds of ores. Two years have since gone by, and by the last reports from the mines I read that the monthly deficit is still 150*l.* or so to cover cost! Surely, in these times of overflowing capital the directors could borrow (if the shareholders do not like to pay up more) further capital, energetically to go to work. But, for the credit of English enterprise, if they cannot push on let them sell to others who will, as doubtless there are those in England who would be as willing to give 10,000*l.* or more for an undertaking thus far developed as others have been to give more than that sum for one nearly unopened, as appears by the advertisements in the Journal lately to have been the case. A SHAREHOLDER.

THE NEW TEIGN VALLEY LEAD AND BARYTES MINE, DEVON.

SIR,—As an old subscriber, and one who "does a little in the mining way" in North Wales, I read with much interest a reference to the above property, under the head of "New Mines, especially Lead," in the Journal of Feb. 12, and as your correspondent referred to our Van and other Welsh mines, I thought I would have a peep, *en route* for Cornwall. A parliamentary ticket passed me on through the busy Black Country to Bristol on Tuesday last, where perchance I met an old friend, who joined me to Exeter next morning by the 8.30 train; a good result, my friend being well up in the descriptive art of a railway traveller. He first dilated upon the busy scenes at Bristol, its Bedminster coal, waiting to be worked, its dock facilities, projected rail into the Somerset coal fields at Radstock, branch lines to the Mendip Lead Mines, Cheddar Cliffs and Cheese. At length we arrived at Highbridge, where he dilated upon the wonders of granite from Sandy Island. At Taunton we are told of the Bridgewater election perjury cases, then going on at the Assizes. We pass cement works, see the Quantox Hills in the distance, where many an old stag has been hunted by the master of the Devon and Somerset staghounds. The Exmoor range is also towering in the distance, where ironstone and forest deer abound. The Brendon Hills are also seen, but not the branch rail that conveys its mineral to Watchett, and thence by boat to South Wales. We are told by a farmer of the unrivalled products of Taunton Vale. The Wellington monument tells its own memorable story on an adjacent hill, while the Messrs. Fox and Co. show where the West of England cloths are made. Burlescombe station is busy in the delivery of lime from its mountain rocks to the farmers around. We next pass the White Ball Tunnel, memorable in Brunel's annals of tunnel exploits *versus* gradients—the Tiverton Junction of Palmerston fame, where "the water would not run up hill," and Rowcliffe, the butcher, ventured to discuss politics at the election with this veteran lord. My friend next spoke of the delightful orchards, cider, cream, and junkett of his native Devonian county, and revelled in his praise of their irrigation, but not their small fields.

The Hele and Bradninch station told of the Esparto grass from Spain that was being used at the several paper mills; and truck loads of flax straw also pointed to the manufacture of this article of native produce. The winding streams are bountiful in fish for the Waltons' pleasure. Killerton Park, the seat of the Acklands, and Pine House, the seat of Sir Stafford-Northcote, each point to the residences of some of the worthies of Devon. A whistle from our guard announces our arrival on the confines of the old city of Exeter. "Your tickets, gentlemen," and we note the North Devon Junction, for the Ilfracombe, Lynton, Westward Ho! and Tourists' coast, not forgetting the old lead and silver mines at Combmartin, and the once noted (prospective) gold mines at North Molton, where we were once shown "the captain who sees to the gold at the other end" (?). Exeter is reached; what a capital station, cathedral, and good old city. We do the luncheon, my friend goes on, and I charter a fly for Teign Valley. As luck follows the brave, I get the very cabby who drove out the engineer "the tother day." This suggests the use of the "box seat," and we discuss prospects of the mine most freely. Whether cabby was on the look-out for another day I cannot say, perhaps so; but, true it is, he did lay it on most capitally, and told how ore had been sold from the Teign's neighbour—Frank Mills; how the meetings had told in favour of the share list; in fact, Teign Valley lead and barytes were then uppermost in my companion's thoughts. As for the directors, they were "gentlemen of the first order, and such a clever engineer." Some seven or eight miles had to be traversed over a country studded with round hills, game-preserving valleys, rich and poor land, ere we reached the Bridford Inn, at the foot of the mines, within 200 yards of the terminus of the new railway now making from the South Devon line. The cuttings and sections along our route did not afford much encouragement to a mining man, but, as my coachman observed, "It dost best as a sort of summer country," a remark amply confirmed on my part, while the flakes of snow were passing around us.

True to the moment, we are met at the mine by Capt. Cornish, a couple of old miners, with picks in hand, a change of underground garments for "the gentleman who has come to inspect the mine," and we proceed to business. We found this neighbourhood to abound in mines, seemingly upon the same run of country, taking their bearing about north and south, and parallel with the granite country, and about half a mile distant. The two most northern and elevated mines, compose the Teign Valley sett, and are immediately connected—a great advantage to future workings. The upper lode, at "Birch Aller," has been proved to considerable extent, engine-house and offices erected, and a quantity of lead ore has been sold. The lower mine, at Stone, has also been proved for barytes, which is shown in the adit level, from 15 to 25 feet wide, a perfect quarry, and easy to raise—from this adit a level has been driven west to intersect the two lead lodes (proved at the upper mine), these have been reached and proved, but too shallow in depth to produce any great results. This mine has also an engine-house and offices, and everything in a forward state for developing the mine, especially the mountain of barytes, which may be quarried for even in the very summit of the hill. The next in order, to the south about two miles down, is "Adam's Mine," which produces both lead and copper—next the old Exmouth lead and copper mine—then Frank Mills Mine, which has recently been paying liberal dividends from the sale of lead, there are also barytes at this mine, but not to such an extent as at the Teign Valley lodes above. Below this comes the South Exmoor Mine for lead; and at a distance of about half a mile below the last mine, we find a lode of barytes and other minerals. The whole of these lodes are contiguous to the Teign Valley Mines—it might fairly be named a mineral line—we took our samples, doffed our mining clothes, and repaired to the (to be) Mineral and Railway Inn, where Capt. Cornish told how fortunes were to be made in mines, "when properly developed in depth," hinted at new and more central shafts, &c., for the Teign Valley lodes, and after toasting the adventurers, and drinking success to the enterprise, we parted, certainly to meet again another day—on the mine. S. M. R.

North Wales, March 23.

VIRTUOUS LADY MINE.

SIR,—After several months' absence I have just completed another visit and inspection of this property. It may interest some of your readers to know the result, free from the somewhat extravagant and exaggerated mode of laudation from which this most valuable and interesting mine has been made to suffer by the over zeal of its friends. It having been previously worked, the present company intended to lay open new ground by sinking and driving under the former workings. With this aim steadily in view, the quantity of work done, and efficiently done, in a comparatively short time, is very remarkable, and few men who know anything of mine work will be found to accord anything but praise for the energy and skill brought to bear in reaching the present successful position. The water-wheel, by the power of which the mine was cleared to the 17 fm. level, is more than able to cope with water at a much lower depth, and they are now usefully engaged in sinking the engine-shaft to the depth of the 24 fathom level in Wheal Bedford, at which point it is generally known a rich course of ore runs under the existing level of the Virtuous Lady. This is the heaviest and almost the only piece of dead work they have in hand. It is sinking by six men, at 18*l.* per fm., and in about 3 fms. more they expect to reach the requisite depth. The shaft is being completed in a thoroughly miner-like manner, and of a capacity sufficient for all the work required of a main shaft. At about 50 fms. east from the end of the adit driven on the course of the south lode, a cross-cut is being driven to intersect the south lode; and, according to the dialling, subject, of course, to the underlie, may cut the lode at any time at a point most advantageous for the work of the mine. This, of course, is dead work, and at 6*l.* per fathom is a very small drain on the funds of the mine; but if the surface operations and erection of machinery are left aside, it includes all the unproductive work the development of the mine at present requires. All the pitches and drivings are yielding well; even Metherill's end, driving on tut at 7*l.* per fathom, is leaving a good profit to the adventurers. In about ten days or a fortnight the crushing rolls, crushing-house, and all the connections will be completed and at work by the aid of a second water-wheel, now erected for this department of the work. This accomplished, all the parts of the mine now in work are, and will be, yielding profits, excepting the two mentioned above. And the remarkable feature of this state of the facts is that the results are, so far, found money, for it was never expected that the old workings would yield, as they are all doing, profitable results. All that has been done in developing the new parts would have had to be done had the outlay yielded nothing. The ore broken and now being hauled and dressed for market will very shortly be in the market, and will speak for itself better than I can.

The financial position of the undertaking is everything that could be desired. There are no debts; the machinery, stores, and all labour have been paid for, whether dead work or tribute, and there is a credit balance of cash in favour of the mine of nearly 1500*l.*, without estimating the value of the large piles of rich ore now on the several dressing-floors. Whatever point of view this mine is looked at, it stands well, and I cannot but think that it is likely to give results equal to anything that a rational and well-informed adventurer could desire. I believe it will not only pay the adventurers well, but will prove an immense boon to the neighbourhood, by giving well-paid and profitable employment to a large number of workpeople. SHAREHOLDER.

[ADVERTISEMENT.]

VIRTUOUS LADY—BRENTOR—THE QUEEN.

SIR,—Next week I intend to give full details of our progress and operations, &c., at the Virtuous Lady, Brentor, and Queen Mines; meantime, search England through, and you will find it difficult to produce such another trio as regards present discoveries and indications for future great and certain success.

There is not a single doubt that the Queen district is the richest for silver in the whole world, and I will soon prove it, and make the fortunes of hundreds of individuals by so doing, including that of— THOS. J. BARNARD.

5, Abbey Mead, Tavistock, March 24.

THE CHANNEL BRIDGE.

SIR,—In acknowledgment of the fair, though cautious, tone of the article in the Supplement to the Journal of March 12, on this subject, I venture to trouble you with some particulars respecting it, which I hope you will do M. Boutet the justice to publish, as it is to be regretted that most of those who are acquainted with the subject of the Channel Passage, in their eagerness to urge some particular scheme, are led to attack and disparage all rival projects. A bridge being obviously the best, if it is practicable, and M. Boutet's bridge the one that has made most progress, it is not surprising to find it attract much animadversion. I cannot call it adverse criticism, because no tangible objection has been advanced against it.

It has been stated in a paper which refused to publish letters on this project that there are no English subscribers to the Anglo-French Bridge Company; that French engineers are indifferent to it, and deem it unworthy of notice; that the Emperor's intention to have a bridge of 100 metres, built on M. Boutet's system, is a delusion; and that the proposed Channel Bridge is a tubular bridge on 190 piers, costing 30 millions.

M. Boutet's proposal is for a bridge on 29 piers, estimated to cost only 8 millions. I was present at the meeting, held in Paris, on the completion of the model of 66 feet. Other English subscribers were present, and proxies were produced from others who were unable to attend. Amongst those represented there were 40 French engineers, some of whom were present, and addressed the meeting (the engineer of the Montmorency Railway did so). It was stated by the President of the meeting, Comte Cardaillac (who is chief of one of the departments of the French Government) that a commission of French engineers, whom the Emperor had sent to examine the plan for his private satisfaction, had reported in favour of it; and I afterwards happened to be at the Depôt des Marbres, when General Favé, the Director of the Ecole Polytechnique in Paris, than whom I suppose there is no higher authority in France on such a question, came to see the model. He was unmistakably satisfied with it, and I heard him express his admiration of M. Boutet's system in no measured terms. So much for French engineers' indifference.

The Emperor's intention to have a bridge of 100 metres built, and paid for unconditionally on completion, was publicly stated at the meeting by the President, and a resolution was unanimously agreed to for forming a company for the purpose, which is in progress, and a bridge of the length of 100 metres is nearly finished.

London, March 22. AN ENGLISH SUBSCRIBER TO THE ANGLO-FRENCH BRIDGE COMPANY.

THE LONDON, CHATHAM, AND DOVER RAILWAY.

SIR,—As the affairs of this company are now approaching a settlement, the importance of the line as a public undertaking will become more manifest. In this respect it cannot be said to hold a less important place than the South-Eastern, the stock of which is now at 75, while the Chatham is only at 15. The latter also has the advantage of being the shorter line of the two to the Continent, and this fact, in the event of an amalgamation being proposed, will enable the Chatham to make favourable terms, as it has already done in arranging for the continental traffic. The line, however, is a very important one, from its Metropolitan extension and branch to the Crystal Palace. It also passes through the richest agricultural district in England, which is fast becoming suburban, and the traffic must, therefore, develope from the mere effect of the vast increase of population which is taking place over the line.

Now, to benefit the shareholders generally, the proper course would be to *re-construct* the company—that is, to purchase the several interests, and amalgamate the whole stock into one uniform denomination by a *pro rata* arrangement with the shareholders, offering them new stock, or paying them off at a certain valuation, whether for debentures or for original shares.

Taking the present market value of the line, it might be purchased for about 6,350,000*l.*, estimating the loans (say) 4,300,000*l.*, at a depreciation of one-half, and the shares (say) 12,600,000*l.*, at two-thirds. If Government were disposed to purchase railways as they have done the telegraphs, they might make a commencement with the Chatham on advantageous terms, and this proposition is one which especially concerns the Government, as the line connects some of the principal arsenals in the kingdom. If this proposition were submitted to the shareholders, at a general meeting, it would be hailed with satisfaction.—*March* 23. A SHAREHOLDER.

[For remainder of Original Correspondence, see this day's Journal.]

Meetings of Public Companies.

DON PEDRO NORTH DEL REY GOLD MINING COMPANY.

The general meeting of shareholders will be held at the London Tavern, on Wednesday, when the following report will be presented:—

The gold raised during the year 1869 amounted to 201,581 ozts., or 23,242 ozs. troy, and realised the sum of 87,999*l.* 14*s.* 8*d.* The "cost" for the same period has been 33,342*l.* 15*s.* 2*d.*, the profit on the year's operations amounting to the sum of 55,428*l.* 15*s.* 4*d.* The dividends declared for the quarters ending March, June, and September have absorbed 38,921*l.* 19*s.* 2*d.*, leaving (with the amount brought forward from 1868) an available balance of 17,710*l.* 18*s.* 11*d.*

This sum the directors propose to deal with as follows:—15,549*l.* 14*s.* 10*d.* to the payment of a dividend of 4*s.* per share, free of income-tax, making, with the dividends already paid, a return for the year of 14*s.* per share, or 100 per cent. on the capital of the company; 1000*l.* to the reserve fund, making the balance at the credit of that account 8000*l.*; the sum of 1161*l.* 4*s.* 1*d.* being carried forward to the current year.

These brilliant results, affording such convincing proofs of the value of the company's property, cannot but be gratifying to the proprietors, more especially when it is remembered that the operations have been seriously impeded by water, so much so that many of the rich portions of the mine have been, and still are, necessarily under suspension.

With a view to making these points again available, measures have been adopted to unwater the lodes:—1. By the erection of a horse-engine, as a temporary measure; and 2. By the construction of heavy permanent pumping machinery.

The horse-engine has already gone to work, and the manager reports that it is doing good duty, and will enable sinking to be prosecuted for some time. The permanent pumping machinery, which has been constructed by Messrs. Harvey and Co., of Hayle, is almost ready for shipment, and special arrangements have been made for facilitating its transit, so that no time may be lost in getting it to work.

The prospects for 1870 may be summed up as follows:—

Pending the erection of the permanent pumping machinery, highly satisfactory results may be expected from the three following sources, viz.:—

1.—From the resumption of operations on the rich stopes below water level, by means of the horse-engine already at work.

2.—From the reserves of ore in the mine, reported as little less than those at the end of 1868, then estimated at between 40,000 and 50,000 tons.

3.—From important recent discoveries.

The new run of ground, called No. 6, is duly referred to by the manager in his annual report, but since the date of that document auriferous ground has been struck in Alice's west, which, in his letter of Feb. 1, Mr. Symons alluded to as follows:—"Lode cut in Alice's west is opening out most satisfactorily, eight boxes of work (about half-a-ton) were taken from it on the 28th, which gave 70 ozts. of gold; the general body gives fair strake work. It is about 40 fms. west in Alice's from where main shoot ceased to be auriferous, so in all probability it is entirely a new thing, and not in any way connected with our main shoot of lode"

When it is borne in mind that the produce during 1869 has been mainly derived from the curve or No. 5 lode, discovered in 1868, assisted by the reserves of ore left in the mine, the importance of these recent discoveries will be fully appreciated, whilst their immediate value to the company may be judged from the fact that both of them are situated above water level. Whilst, therefore, congratulating the proprietors on the past, the directors look with undiminished confidence to the future.

Appended to this are reports from Capt. Thos. Treloar, consulting engineer, Mr. F. S. Symons, the manager, and the mining captains. The accounts, prepared to Dec. 31, have been audited by Messrs. Quilter, Ball, and Co., whose report is annexed. The directors who retire by rotation are Messrs. Henry Haymen and S. Lloyd Foster, who, being eligible, offer themselves for re-election. The auditors to the company, Messrs. Quilter, Ball, and Co., also retire, and, being eligible, offer themselves for re-election.

The following is the manager's report for 1869:—

1.—It is a pleasing duty to lay before you the report of proceedings of 1869, and though the results, owing to unforeseen circumstances, have not equalled those for 1868, they are such as should be highly satisfactory to all connected with the concern, inasmuch as we have been enabled to declare a net profit of the sum of 53,301*l.* 5*s.* 11*d.*, and are in position to hold out first-class prospects for the future.

2.—In my last annual report I wrote that our profits for 1869 would, I hoped, exceed those for 1868, judging from the then appearance of the mine, and from the belief that the greater body of water was south, and not north of flookan; but in this we were mistaken, and water has been encountered in much larger quantities than expected. In March we attained the splendid return of 28,220 ozts.; from that date water commenced to give trouble. At first one pump was put to work, then two, and, lastly, four Californian pumps were found requisite, so that sinking and stoping might be prosecuted. Under these difficulties, the labour of quarrying was greater, less duty performed, and less of the good ore from the bottom of the mine broken. These drawbacks were experienced in excavating the shoot of lode cut in 1868, entitled the "Curve." In that year water disabled us from following down Nos. 3 and 4 lines, so that we can say we have had this element to encounter and fight against since June, 1868. Discoveries of new runs of auriferous ground have, however, enabled us, notwithstanding great and increasing difficulties, to show splendid profits, and prove that the mining field possessed by the Don Pedro Company is one rarely to be equalled.

3.—In 1868 we cut the curve, which has conduced so much to the splendid results obtained, and in this year had the good fortune to meet with a new body of lode in driving Alice's straight level, 8 fms. south of curve; for some time it was poor, then a small line was discovered in the footwall, which at times gave box-work. In December the stopes rising west improved, and we encountered a line which has given rich box-work. After sinking 19 fms. on the dip of this lode, below Alice's level, a fissure was encountered, that heaved it so far north as to form a junction with the lode in curve. This discovery will prove of great importance to the company, as it adds so largely to our reserves above the water level, and will assist so materially in keeping up the produce until the erection of the pumping machinery enables us to sink and open out new stopes.

4.—During the greater part of the year we have been engaged erecting a horse engine, which will go to work early in 1870. The erection of this machine has been a heavy and expensive piece of work, but we hope it will enable us to prosecute sinking for some time. In 1870 we expect to receive permanent pumping machinery of great power, and hope to turn out of hand a large amount of work in connection with the same.

5.—Our prospects for 1870 are good; and though the year will be burdened with a heavy cost, I hope the shareholders will not be dissatisfied with the results we shall be enabled to show, as not only is our stock of reserve ore good, but there is the hope of new discoveries in the explorations, particularly in those west.

6.—With exception of "Canos," in the northern extremity of the auriferous ground, nothing has been done towards excavating reserve underlie lode this year, or following down Nos. 3 and 4 lines, and but a small proportion of the reserves we-t of gully have been treated. Those of curve have been taken away as far as we can proceed for water, but as we have now the new discovery, or No. 6, the quantity of reserves is little less than at the end of 1868. As to quality, it is impossible to make an estimate, but I think it should be considered highly satisfactory that the company should have such a reserve to fall back on whilst sinking is thrown back, and pumping machinery in course of erection.

7.—Not only has water interfered with the supply of ore, but by taking so many of our best hands to man pumps, the exploratory works have not been

carried on as I could wish (I do not exaggerate when stating that the pumps have employed 40 of our best hands daily). This I much regret, as on the immense field of mineral ground the company is possessed of, explorations should always be going on. In 1870 we shall be able to assign more hands for this, as machinery in many instances will relieve manual labour. I allude to the whim now at work for hauling, and the horse engine about to go to work for pumping.

8.—At Tambor we have not discovered auriferous ground, though lodes of most inviting appearance have been worked on. A commencement was made to explore a gully further west than Tambor—Mato das Cobras, where extensive workings by the Antigos were discovered, but pressure for hands at our main workings obliged us to discontinue. In 1870 for both these sections we hope to be able to assign a sufficient force.

9.—In concluding my general remarks, I hope I may not be considered too sanguine when stating that the Don Pedro Company possesses probably one of the best mining properties in the world. All mining enterprises are subject to fluctuations, jacotinga mines more so than others; but after stating that our lode in the bottom is of good quality, more extensive than heretofore, that our reserves hold out promise of giving an enormous amount of lode; should a temporary falling off in produce take place in the ensuing year, it should be borne with philosophy, bearing in mind the fact that when the plans for the future drainage and carrying on the works are completed, it is the opinion here that the Don Pedro will achieve greater results than it has yet done. In less than four years upwards of 172,000*l* profit have been declared. The lode continues in depth auriferous, and we have not yet reached the shoulder where the rich deposits are expected.

PRODUCE.

10.—The total gold return amounts to 201,581 oits., derived solely from the Maquine jacotinga formation.

PRODUCE AND COST.

11.—Produce, 201,581 oits., value	£85,671	8	7
Cost	32,370	2	8
Profit	£53,301	5	11

GENERAL BRAZILIAN MINING COMPANY.

The first annual meeting of shareholders will be held at the London Tavern, on Thursday, when the following report will be presented:—

The directors have the pleasure of submitting their first report to the proprietors, which embraces the operations of the company from its formation to Dec. 31, extending over a period of eighteen months. Appended will be found a report from Capt. Thomas Treloar, the manager of the company, bearing date Jan. 8, as also a further description of the properties, accompanied by a map of the Santa Anna and Itabira estates, received by the last mail. These documents enter fully into the present position and prospects of the company.

It is to be regretted that great delay was experienced in acquiring the several properties; but when it is borne in mind that they were represented by nearly 300 owners it will be manifest that the utmost caution was requisite on the part of the company's agents. The directors consider, therefore, that they have good reason to congratulate the proprietors on the successful completion of an affair of such magnitude, resulting as it has in the acquisition by the company of three properties which, in Capt. Treloar's opinion, will show greater results than any mining company which has ever been established in Brazil. The directors feel confident that the energy and skilful management at all times displayed by Capt. Thomas Treloar will, by means of the monthly slips, be furnished regularly to the proprietors, detailing the various mining and surface operations. The accounts have been prepared from July 21, 1868, to Dec. 31, 1869, and have been audited by Messrs. Quilter, Ball, and Co., whose report is annexed.

The following is from the report of Capt. Thomas Treloar:—

Itabira do Matto Dentro, Jan. 8.—The company has succeeded in obtaining what was considered. I may say, an impossibility—the mining properties of St. Anna, Itabira, and Conceicao. The owners were so numerous, their holdings so various, their wordly circumstances so different, and their feelings so diverse, that it was considered impossible for any company ever to get safe possession of these mines. But it has been accomplished, and the General Brazilian Company may congratulate themselves upon possessing a mining property vast in extent, presenting greater prospects of great success than that of any other mining company, past or present, in Brazil. The purchase, however, was not effected so quickly as expected, a circumstance somewhat disadvantageous to early extraction of the precious metal. In January last mines were open, and yielding gold, but becoming dangerous for want of repairs, and the owners, feeling that repairs would be of no benefit to them, allowed the said mines to crush together before the property was transferred to the company. Again, the purchase having been concluded towards the close of the dry season, and the wet season unfavourable for the commencement of operations, the works hitherto have been on a small scale, confined, in fact, to preparing house accommodation, making and repairing roads, examining water-sources and clearing water courses, examing woods, enclosing pastures, organising force, and other preparatory measures for the commencement of mine operations in 1870. A staff of Europeans, and the materials required, have been sent for, and are now in transit to this place. I am glad the wet season is already so far advanced, and I am anxious for it to be over, in order to commence mining operations. Beyond careful re-examination for sites of adits nothing, as regards mining, has been done. Shallow adits will be driven for early extraction of gold, and deep ones to take effect at later periods, and a map, exhibiting the said adits, will accompany report for January. Some time, perhaps a couple of years, may elapse before we reach the shoots of gold left in the bottom of the St. Anna and Itabira Mines, but between these two properties there is a large field of unexplored ground of very high promise, which will be examined forthwith, and before 1870 elapses discoveries will, I hope, be made which will equal, if not eclipse, the past of these far-famed mines. Besides the unexplored ground just referred to we have some scope at other places. I am pleased to say that our force is gradually increasing, and after the wet season is over, and the crops now in the ground safe, hands will appear in much greater numbers. The average number during December has been 150, and for a single mine, considering we have only had possession a few months, this would be a fair force, but for such a property as ours, and the scale on which we shall work, it is only, if I may so express myself, just sufficient to dot a few hands here and there.

[For remainder of Meetings see to-day's Journal.]

FOREIGN MINING AND METALLURGY.

The Paris coal market presents little change. Affairs in coal for domestic purposes remain extremely quiet, and transactions have generally been of less importance than in former weeks, being confined to the requirements of daily consumption. In the renewal of contracts some advance on last year's prices is anticipated, as in consequence of the smallness of the stocks on hand the coal workers who supply the Parisian market are expected to raise their pretensions. There are no signs of the close of winter apparent at the mines of the Loire, the Nord, and the Pas-de-Calais; on the contrary, the extraction of coal is carried on upon a great scale to reconstitute stocks to some extent, and also to execute contracts which have fallen into arrear. The deliveries made by railway and by water continue on a large scale. Prices maintain considerable firmness. The last few days have been attended with little change in the aspect of the French iron trade. In the Haute-Marne a small current of orders executed from day to day prevails; contracts previously received are also not yet fully executed. Rolled iron and sheets remain firm, and some orders have come to hand, more especially for second-class, third-class, and fourth-class specimens; first-class specimens are neglected. Coke-made iron is quoted at 8*l*. to 8*l*. 4s.; mixed ditto, 8*l*. 8s. to 8*l*. 16s.; and puddled charcoal-made at 9*l*. to 9*l*. 8s. per ton, according to quality, in warehouse at the works. As regards machine iron, the demand for it has been well maintained during the comparatively dull and quiet times through which the district has been passing; the rolling mills devoted to this description of iron have not slackened their operations for a single instant, and they are now working with their full force; mixed qualities have made 8*l*. 8s. to 8*l*. 16s. per ton, according to the works. The foundries of the Haute-Marne begin to want orders; large castings for bridges, railway *materiel*, &c., still occupy some works, but general "castings of commerce" remain comparatively neglected; there is some demand for pipes and wheel tyres. The iron trade has not experienced any material change in the Moselle district; quotations for iron and rough pig are very firm, and the latter has even been tending upwards. The works of the Moselle appear, on the whole, to be better off for orders than those of the Haute-Marne. It is proposed to construct two other furnaces at Rehon. The Moulaine furnaces are not yet re-lighted, and in the valley of Moulaine only one is in activity—that of M. d'Huart. It is reported that M. d'Adelsward will shortly establish a third great blast-furnace at his Grand-Prieuré works, at Mont St. Martin, where he has two blowing-engines on the Farcot principle.

The demand for coal remains good in all the Belgian basins, and prices are maintained with firmness. At Liége the demand for coal for domestic purposes has experienced a certain falling off, but, on the other hand, coking coal has been in excellent demand. The production of coke in the Liége basin is still being continually developed; contracts have been renewed at 16s. per ton, and this rate is maintained with such firmness that a further advance is anticipated. Several establishments, it may be added, propose to construct new furnaces. The Customs Administration has just published tables, illustrating the commercial relations of Belgium with foreign countries during January, 1870. It appears that coal was exported from Belgium in January to the extent of 348,176 tons, against 266,261 tons in January, 1869. Coke was exported in January to the extent 61,134 tons, against 36,404 tons in January, 1869. Of the coal and coke exported from Belgium in January, 336,439 tons of coal and 39,150 tons of coke went to France. The encouraging figures established for January are, of course, regarded by Belgian coalworkers with much satisfaction.

The Belgian iron trade has continued extremely quiet. The attention of industrials has been especially directed to the consequences of the French decree of Jan. 9, 1870, with reference to warrants and to the movement which has arisen in France against the suppression of the facilities which that system accorded. The quantity of minerals imported into Belgium in January was 47,105 tons, against 31,955 tons in January, 1869, and 15,512 tons in January, 1868. On the other hand, iron minerals were exported from Belgium in January to the extent of 12,135 tons, against 8470 tons in January, 1869, and 7467 tons in January, 1868. The exports of plates from Belgium in January amounted to 1453 tons, against 1500 tons in January, 1869, and 634 tons in January, 1868. Rails were exported from Belgium in January to the extent of 7753 tons, against 5034 tons in January, 1869, and 4110 tons in January, 1868. Of the rails exported from Belgium in January this year 1100 tons were forwarded to Russia, 2543 tons to the Zollverein, 1075 tons to Italy, 1325 tons to Turkey, and 1230 tons to the United States. The relations of Belgium with foreign countries in the matter of iron would seem to be still extending. It is understood that the Russian Minister of Finance will present shortly to the Council of the empire a proposal for the sale of the mines and metallurgical works of the State, except those which are required for the army and the fleet. The auriferous workings of the Russian empire will also, it is stated, be shortly offered for sale. Tenders have just been delivered at La Haye for a great iron bridge, about to be thrown over the old Meuse, near Dordrecht, for the purposes of the Netherlands State lines. The lowest tender was that of the Butterley Iron Company, of Alfreton, 64,037*l*. Mr. Vandenwall Bake, of Utrecht, tendered at 66,145*l*.; Messrs. Van Hissengen and Dudok Van Heel, of Amsterdam, at 73,687*l*.; MM. Schneider and Co., of Paris, at 74,300*l*.; Messrs Jacobi Haniel and Huyssen, of Sterkrade, at 74,640*l*.; Messrs. Hopkins, Gilkes, and Co., of Middlesborough, at 76,000*l*.; Messrs. Brassey and Co., of Birkenhead, at 77,880*l*.; Mr. J. C. Harkorten, of Harkorten, at 77,978*l*.; and MM. Joret and Co., of Paris, at 85,500*l*.

The Prussian iron trade has continued active, and thus far Prussian industrials seem to be free from the fears and apprehensions which have often occupied their minds at the commencement of a year. Nothing has occurred to shake the general confidence, and enterprises of various kinds have been launched with vigour. The proprietors of some works are said to have in view an extension of their establishments, and most of them are working energetically day and night, and with all their strength. The blast-furnaces, although continually in full activity, have scarcely been able to meet the orders received, and prices have advanced in consequence 10 per cent. It should be remarked that the cost of production has increased at the same time, the prices of minerals and coke having advanced. Coke has brought in the Essen district about 14s. to 16s. per ton of late; the consumption appears to be extending more and more. Statistics just made up show that the production of rough iron in Prussia in 1868 was 1,053,259 tons, as compared with 915,668 tons in 1867, and 803,352 tons in 1866. The production of 1868 would thus seem to have increased to the extent of 15 per cent. over 1867. The returns for 1869 are not yet forthcoming, Prussian statistics not being distinguished, apparently, by much expedition.

Copper has maintained its price pretty well of late upon the principal European markets. At Havre, Chilian in bars has made 68*l*. 4s. to 68*l*. 8s. per ton; refined ditto, in ingots, 74*l*.; Peruvian mineral (pure standard), 70*l*. to 70*l*. 10s.; United States (Baltimore), 76*l*. to 78*l*.; Lake Superior ditto, 80*l*. to 86*l*.; and Mexican and La Plata, in bars, 66*l*. to 68*l*. per ton. At Marseilles, Toka in warehouse has brought 76*l*. per ton; Spanish, 68*l*. 16s.; and refined Chilian and Peruvian, 74*l*. per ton. There has not been much doing in tin of late upon the Dutch markets. Banca has made 71 fls., and Billiton 69 fls. to 69½ fls. A lot of 700 ingots of Billiton, to be forwarded from Java at the commencement of this month, has made 67 fls. At Paris, Banca has made 126*l*.; Straits, 126*l*.; and English, 122*l*. per ton. The lead markets display little variation. At Paris, Spanish saumons have made 18*l*. 16s.; French ditto, 19*l*.; English, 18*l*. 16s.; and German and Belgian, 18*l*. 18s. per ton. At Rotterdam, Stolberg has realised 11¼ fls. There is not much change either to report in zinc. At Paris rough Silesian, to be delivered at Havre, has made 20*l*. 8s.; other good marks, 20*l*. 8s. to 20*l*. 10s.; and rolled Vieille Montagne, 28*l*. per ton.

MINING IN AUSTRALASIA—MONTHLY SUMMARY.

MELBOURNE, JAN. 31.—The mining news of the month is more satisfactory. Excellent yields have been recorded from several of the principal gold regions. Berlin maintains its reputation as a nugget-producing district; 12 nuggets found in this locality within the past fortnight, weighing from 5 oz. to 60 ozs. each. A 10½-oz. nugget, unearthed at Argyle Gully: 300 tons of quartz from Pleasant Creek Cross Reef Company's claim yielded 861 oz. 19 dwts. gold, or 2 oz. 17 dwts. to the ton. Prospects at Bendigo are most favourable; the yield for December was 20,882 oz.; value, 83,558*l*. Total gold export during 1869, 1,700,972 oz.; value, 6,804,179*l*., of which 342,742 oz. from New Zealand, and 17,392 oz. from New South Wales; value, 1,449,420*l*. Crops almost wholly in.

Another coal field has been discovered in Tasmania, by Mr. Andrews, contractor, on the line of the Mersey and Deloraine Tramway, as it passes from Railston towards Caroline Creek. It appears that the workmen in carrying out the works had exposed a seam of what is described as a "magnificent coal."

GREAT DEVON CONSOLS.—A contract has been entered into by a miner to raise 5 tons of copper, he receiving 100*l*. for his work if successful, and nothing if he fails. He is confident that he knows the whereabouts of a good lode, and a fine stone of quartz, with beautiful purple ore in it, which came from the ground he is working at, has been shown.

IMPROVED STEAM-STAMPS.—To secure stamps of fair power, and capable at the same time of being easily transported in mountainous districts, has often been attempted in vain; Mr. W. RASCHE, C.E., of Melbourne, Australia, claims, however, that he has succeeded completely in removing all weak points from their construction, and that his batteries are, in their present state, truly valuable and practical machines, indispensable in places where heavy machinery is inaccessible. Their crushing capacity is greater than that of the ramshaft description, as they may be advantageously worked at greater speed than the latter (without risk of losing the very fine gold, adopting tables of larger dimensions), and friction being avoided. The discharge of the tailings is very free and easy, opposite three sides of each head, grating area being 300 square inches per head. Feedshoot is 15 in. wide, and feed apparatus is ample for all requirements, distributing the quartz equally. The saving effected by the adoption of the above batteries in the cost of transport, foundations, gearing, erection, sheds, fuel, and attendance is very great; and the little expense incurred by removal of the plant from one locality to another is a very important circumstance in connection with these batteries. Their construction is warranted durable, and all strain but that by direct lift, is avoided. As the shanks are loose in the sockets of the cross-heads, the heads or stamps are free to rebound, consequently no strain is caused by unequal feeding, &c. The boxes are cast separate, and are only linked together, therefore there is no risk of breakage from the whole weight of the heads falling simultaneously. The column which carries the steam-engine stands isolated on a central foundation, therefore the vibration in the boxes due to the blow is not communicated to the engine. To prevent strain on the valve-gear, buffer-springs are placed at the head of the column; and to insure the continued good wear of the valves, the valve-roller or tapet is held between spiral springs. The engine is of special construction, works with great precision, and independent of the quantity of quartz, &c., fed to the boxes. Mr. Rasche states that with his improved generator a much greater quantity of steam may be obtained from a given quantity of heat than from a vertical generator of the existing construction. By means of the improved construction increased efficiency is obtained—that is, enlarged heating surface, and an enlarged grate. The ratio of the former to the latter is as 18 or 22½ to 1—i. e., for every square foot of grate surface an effective heating surface of 18 or 22½ square feet is obtained, even when the vertical surfaces of the plates are set down at half. Mr. Rasche also claims for his invention that by means of it the danger of explosion will be considerably lessened, and probably confined to the bursting of a pipe. Generators of the improved description would not only be very strong, but less expensive than those now used.

NEW PROCESS FOR UTILISING LOW-CLASS ORES.—The attention of all who visit Moonta must necessarily be directed to the large pile of tailings near to the railroad, the refuse of the ore from the crushing and dressing works at the Moonta Mines. We have on more than one occasion directed attention to the excellent appliances for dressing ore on a new system, devised by Capt. Paynter, at the Moonta Mines; but from these, as from all others known, although to a less extent, there is a waste of ore—ore that might, if copper were 50 per cent. dearer, pay for being put through the machinery a second time. It is well understood that the Moonta Mining Company, in consequence of the excellence of its ore-dressing machinery, has been able to treat low-class ores with a profit, thereby finding employment for hundreds of men, and maintaining the high reputation of the mine for productiveness and skilful and profitable management. Various means have been devised for extracting the small amount of copper—about 3 or 4 per cent.—from the waste tailings, but hitherto the expense has swallowed up the whole of the proceeds. Now confident expectations are formed that by a process, the secret of which is Capt. Paynter's, the problem has been satisfactorily solved. The works have been in progress some weeks, and the result has been even more satisfactory than was anticipated. Three or four furnaces were extemporised near to the vast heap of tailings, and into each was put 40 or 50 tons of this very lowest class of ore, mixed with a little wood and a composition that is known only to Capt. Paynter. Hollow gum-stacks served for chimneys through which the smoke should escape from the furnaces—furnaces which are simply mudwall enclosures, 4 ft. high—and in these the fire was so arranged as to burn slowly for about a fortnight. On to the ore water was occasionally poured, which every now and then was suffered to drain away into some shallow ponds. That the water became highly mineralised by passing through the furnaces is apparent by its deep green colour when drained away. In the ponds was placed a quantity of old scrap and other iron, the hooping from hay trusses, &c.; and the copper in the water precipitated itself on to these in a thick flowing paste. This paste, which looks like pure copper, was found to contain about 80 per cent., the residue being principally dust settling during the storms peculiar to this season of the year. So far the result must be considered most satisfactory, as the cost of labour, of firewood, and of the composition employed is but trifling, and after precipitating more than 50 tons of copper Captain Paynter is satisfied that tributers will be glad to reduce the whole heap on a tribute of 10s. in 1*l*. But it is not only to these tailings that the process is applicable. It promises to be equally if not more valuable for reducing large quantities of ore that at present are totally valueless to mining proprietors, but which have to be raised in the search for ore of a better quality. Moreover, we are informed that it will take up the scourings of the ditches that drain the mineralised water proceeding from the mines and dressing machines, and extract from them tons and tons of copper nearly as pure as when smelted. It is manifest that such a discovery, if it continues to realise all that it promises, and all that it has been tried to perform, must be of very great importance at any time, but in the present state of the metal trade it is peculiarly timely and acceptable. As far as we are able to judge it is a discovery that has passed the tentative stage, having been so long in operation, and invariably attended with the same excellent results.—*Wallaroo Times.*

AUSTRALIAN MINES.

YUDANAMUTANA (Copper).—The superintendent (Adelaide, Jan 31) states:—I left Adelaide for the mine on Dec. 17, and stayed there until the middle of this month, the main object of my visit being to keep everything as far as possible in working order until the holidays were over; and so far as regards drunkenness on the mine, I was successful in suppressing it almost entirely, and by a careful arrangement with the smelters and miners, so managed that the furnaces were out only six days, during which time, of course, no wages were earned. When I left all hands were settled to work. The copper made during December was 41 tons, by which return you will see that at this particular time my presence at Bliman was of the greatest importance to us. We have proved, by assay and practical results, that with an admixture of third-class ore and smalls with our No. 1 and No. 2 ores our slags are cleaner and our metal runs freer; and we have hitherto felt that so long as the thirds and smalls produce sufficient copper only to pay actual cost of smelting we were warranted in utilising them; our percentage is necessarily brought down by this mixture, but that our mine is producing ore of high percentage the samples sent from time to time will show. I have availed myself of the authority contained in your despatch No. 91, and have drawn on the board at 30 days for 3000*l*.—Capt. Terrel (Jan. 24) reports: Bliman Mine, No. 1 Winze: The lode in this place is looking just the same as last reported.—No. 2 Winze; The lode in this place is not looking as well as it was when I last wrote.—No 3 Winze: The lode in this place, below the 25 fm. level, is looking just as rich as it was when I last wrote—a very fine lode of ore; and what I can see in sight will last some time yet before it will be exhausted. The lode in the winze between the Nos. 2 and 3 shafts (new discovery), as mentioned in my last, is looking very well. Copper made this month to date (three weeks) 32 tons 4 cwts. 2 qrs. 2 lbs.

AUSTRALIAN UNITED (Gold).—The directors have received advices from Mr. Kitto, dated Fryerstown, Jan. 31.—"Duke of Cornwall Mine: Of the gold produced during the present month 26 ozs re-uited from the treatment of 26 tons of quartz tailings and pyrites. Our buddles do not act well, therefore the proportion of clean pyrites treated is only one-third of the whole bulk. In future a greater quantity of clearance stuff will be passed through the mills, and the results improve in proportion. The cost of obtaining 103*l*. 12s. 6d. worth of gold from the mills was 30*l*. 12s. 6d., thus showing a profit of 73*l*.; this, however, is very small compared with what we may reasonably expect when the quartz becomes richer. During the month we have crushed 600 tons of stone, yielding 121 ozs. of retorted gold, or 4 dwts. per ton. On this small yield a profit 101*l*. has been made; this sum, with 73*l*. profit on pyrites, makes the total profit (174*l*.) shown in sheet sent herewith." With regard to the Central Mine, Mr. Kitto remarks—"The shaft is now in stiff clay, and in all probability will be bottomed in a fortnight. The indications here are very promising, and the public are on the tiptoe of expectation, seeing that our success at the Central will open an immense gold field, capable of employing thousands of persons." The agents' reports to Mr. Kitto are as follows:—Capt. Williams, on the Duke of Cornwall Mine, dated Jan. 31, reports—"I beg to hand you report on the mine for the past month. At Daukes's shaft, in the 200 ft. level, north drive, since my last we have driven 30 ft. I stated then that I shall propose to carry the main drive on the eastern side of the flookan, which has since proved to be the best part. In the south drive, 24 ft. from cross-cut, the lode is split by sandstone. I think we shall have the lode the regular size again in about 20 ft. further.—North Stopes: Since my last we commenced stoping; the average size of the lode in the back of the level is from 10 to 12 ft. wide.—South Stopes: In the south of cross-cut stoping after the south drive the average size of the lode is 3 ft. This stope is of better quality than the average of the lode, where it is much wider.—Beari's Shaft: No alteration since last report. All other works are going on well." Capt. J. H. Holmes and Mr. Stephens, on the Central Mine, dated Jan. 29, reports—"We have pleasure in reporting to you that the shaft is in good working order, and sinking going on at the rate of 9 ft. per week; present depth, 208 ft. 8 in. We have bored down 11 ft. 4 in.; at 7 ft. we were still in clay, but the following portion of the bore consisted of a kind of wash. We were prevented boring deeper in consequence of the strong nature of the ground; the water is not so quick as formerly." Since the receipt of the above by the mail, delivered on Monday, the following telegram has been received at the office on Wednesday, dated Galle, March 20, from a Mr. Rich, which the directors believe to be an error in telegraphing for "Kitto":—"Central bottomed very rich."

PORT PHILLIP AND COLONIAL (Gold).—The directors have advices from Mr. Bland, the resident manager, to Jan. 29. The quantity of quartz crushed during the four weeks ending Jan. 5 was 3700 tons; pyrites treated, 25 tons; total gold obtained, 796 ozs. 15 dwts., or an average per ton of 4 dwts. 7 grs. The receipts were 2994*l*. 0s. 5d.; payments (including 293*l*. paid on fire wood and timber account), 4037*l*. 1s. 3d.; loss, 1043*l*. 0s. 10d., deducted from which was last months' balance of 1021*l*., and there remained a debit balance of 1032*l*. 18s. 9d. The return for the two weeks ending Jan. 19 is—Quartz crushed, 2438 tons; pyrites treated, 19 tons; total gold obtained, 461 ozs. 5 dwts., or an average per ton of 3 dwts. 19 grs.

SCOTTISH AUSTRALIAN.—The directors have advices from Sydney (Jan. 28), with reports from the Lambton Colliery to Jan. 25. The sales of coal for the month of December amounted to 10,504 tons, making a total sale for the half-year of 79,227 tons.

YORKE PENINSULA.—The directors have advices from the committee of inspection at Adelaide (Jan. 27), with reports from the Kurilla Mine to Jan. 31. Hall's engine shaft had been sunk during the month 1 fm. 2 ft. 3 in.; total depth, 41 fms. 4 ft 9 in. The following are extracts from Capt. Anthony's report:—The cross branch, named in my last report, driving south at the 25, east of Hall's shaft, has so far improved as to induce me to place four men to drive it this month; it is now 2 ft. wide, containing excellent ore, with quartz and mundic; it is also yielding more water, which is a sign of permanence. Two pitches have been worked during the past month to the east of Hall's shaft, at 10s. in 1*l*., by five men, and are re-set at 10s. and 5s. in 1*l*. for the ensuing two months. At Deeble's shaft the men have been employed during the past month removing ore, first from the east and then the west, and to secure the ends by timbering before sinking again, and the yield is satisfactory. The 25, from Hall's shaft, is driven under Deeble's shaft; the lode is 2 ft. wide, and is fast improving in quality; some good stones of black ore have recently been taken from it. It is also yielding more water, and partially draining Deeble's shaft; price for driving, 6*l*. per fm. It will be no matter of surprise if we get into a paying lode at this level during the ensuing month. The engine and pitwork are working well. The ore sold during the month had produced to the company 53*l*., and a further quantity, of the value of about 35*l*., was about to be sold. The committee do not require to draw by this mail. They write—You will see from Capt. Anthony's reports that his hopes from Deeble's shaft have so far been realised most fully, for it has not only paid its own expenses from the first up to this time, but has left such a surplus as has enabled us to proceed with sinking Hall's shaft for the past three months without drawing on the London office since October 27.

ENGLISH AND AUSTRALIAN (Copper).—The directors have advices from their manager (Port Adelaide, Feb. 2). The smelting works at Newcastle, and the extension of the wharf at Port Adelaide, were progressing very satisfactorily. The furnaces at the Port, which had been let out for stock-taking, would be re-lighted on Feb. 5. Of the 148 tons copper advised by the previous mail as ready for shipment, 10 tons had been shipped.

FOREIGN MINES.

JAVALI (Nicaragua).—The directors have letters dated Feb. 8. The remittance is 203 ozs., valued at 507*l*. This was the result from 10 stamps, running 22 days, and crushing 448 tons of ore. No tailings had been worked this month. The new general manager, Mr. Bird, writes—The very short time I have been on the mine renders it impossible for me to say more than that I find the mill in a much more satisfactory state than I was led to expect, and that I see no reason to doubt the paying qualities of the mine.

PACIFIC.—Mr. Scaddon writes (Feb. 23) as under:—"I am sinking the main shaft with all possible dispatch, and am also driving three drifts in the same manner, for the purpose of developing as much of the ground as we can, to form some idea of the future prosperity of our young mine. My principal study is to do all of this work, and at the same time make it profitable for the company. The ledge in the main shaft is, in my opinion, improving, and if it continue the same to any great depth (and I see no reason why it should not) you need not have any fear but that the mine will be good. The different stopes in the mine and drifts are yielding a supply for the mill, as you will see by the monthly statement. The amount of amalgam from the copper plates thus for this month is 493 ozs., and if it continues the month through the same it will be the largest clean-up we have ever had. Our clean-up day will be on March 5; I will write you another letter before that time. As soon as the weather permits we will have a survey and plan of Union Hill Mine, and send the same to you."

BRAGANZA (Gold).—W. H. Richards and Captain Roberts report (Feb. 16)—We have completed the Cafua water-course, and brought the water into the mine. The lode or vein cut on Feb. 10, of which we advised you in our last, proves to be 2½ ft. big; as we do not think this can be the main lode, we have instructed that the cross-cut shall be driven further west in hopes of finding it. The men have been rising on this vein, and the samples taken from it continue good, although not equal to the one they first washed. The shallow cross-cut has been driven 2 fathoms further west; we have intersected another branch of the lode, about the same size as that first reported. The total width of this channel of ground is about 15 ft., but in the centre there is a stratum of clay-slate about 10 ft. wide, with small veins of quartz running through it, 5 ft., however—2½ ft. at each side—giving very good samples. No doubt we shall find the quartz more prevalent at a greater depth as soon as the level, which is now

being driven on the course of the lode (and is in 33 fathoms), and at 7 or 8 fms. further, will reach this spot, and will then give about 26 to 30 fms. of backs for stoping: this level has produced gold nearly all the way, and the lode proved to be very regular, carrying a good footwall. Here we found visible gold. The greater portion of stone broken in driving this level has been reserved for crushing; it all shows gold more or less in sampling. We have completed some sluice boxes, and fixed the same for alluvial washing, and as far as they have been proved we find they will collect fine gold. Capt. Roberts concludes by saying—I have great pleasure in stating that all the works are going on well, and the mine turning out to be more productive than the Brazilians had suggested. The samples are also proving more satisfactory, and when our machinery is erected, and a quantity of stone reduced, I believe we shall have a lasting and a well-paying mine for the company, as it must be well known that we are in a good gold locality, Cata Branca being on the north, and Morro das Almas to the south of us.

NEW WILDBERG.—J. Sanders, March 18: East Mine: The drivage east at the Erbestollen is looking a little better to-day, yielding good stones of solid ore; present value ¾ ton per lachter, and has the appearance of improving as we advance. Conder's drivage at the 70, is composed of grauwacke, quartz, and schiefer, with spots of lead and copper ore in it.—Carter's Shaft: The drivage and stopes at the 70, on Erbstelstergang Erskammer, remain as last week; the drivage yielding 1 ton, and the stopes 1¼ ton of ore per cubic lachter. There is no change to notice in the rise and stope above the 60, towards Johanne's sink, the yield being 1 ton of ore per cubic lachter. The different stopes above the 50, on Dornergang Erskammer, are yielding on an average 1 ton of ore per cubic lachter.—Beck's Workings: Three men are now working a stope above the 40; the lode at present is worth 1¼ ton of ore per lachter.—Blumengang: The different stopes in this part of the mine remain as last week, yielding respectively 2 tons, 1½ ton, and 1¼ ton per lachter. The drivage west at the 60 is commenced; the ground is composed of grauwacke, schiefer, and quartz, spotted with lead ore throughout, but not sufficient to set a value on. This drivage is commenced near the hanging wall of the lode, and will be driven across it; by so doing we shall prove from 4 to 5 lachters of the width of lode, and hope by so doing to meet with a more productive part of it.—West Blumengang: We have commenced driving the 60 lachter level east from this part of the mine; a few holes have been blasted, and some good lumps of ore broken; we have not opened enough as yet to ascertain its value, but I hope to be able to do so by my next report. This drivage and the other coming towards it will be pushed on so as to make a communication as soon as possible; this is necessary to be done before we can work with advantage at the Blumengang workings.

[For remainder of Foreign Mines see to-day's Journal.]

OUR COAL SUPPLIES.

The Rev. F. P. BRODIE, M.A., F.G.S., vicar of Rowington, lectured on Tuesday, before the Leamington Philosophical Society, "On Coal." Dr. O'Callaghan (the President of the society) occupied the chair, and there was a numerous and fashionable audience.

The rev. lecturer set out by giving a geological history of coal, and pointed out, on a map, the situation of the various coal fields in England and Wales. The true coal measures belonged to the Carboniferous system, where it occurred, between beds of shale, mountain limestone, ironstone, and clay. There were, however, both in England, on the Continent, and in America deposits of coal which did not belong to the Carboniferous system, but to the Oolitic and Tertiary formations, far above the Triassic. The coal which did not belong to the Carboniferous measures, however, was greatly inferior in quality. The thickest coal was what was called the Main coal in Staffordshire, which was about 30 feet in thickness. This, however, was a very unusual thickness. The coal beds generally varied from 6 feet downwards, and bore no comparison to the thickness of the intervening beds of ironstone, limestone, and shale. The total thickness of the coal measures was about 3000 ft., and of the whole Carboniferous system something like 15,000 feet. The Derbyshire coal measures yielded about 30 different beds of coal, varying from 6 in. to 11 feet in thickness. The Coventry coal fields, he observed, must naturally be interesting to residents in Warwickshire. Coal was found just a little to the north of Coventry, but was a comparatively thin band until near Baddesley Ensor; but between that place and the extreme northern limit it thickens out, and becomes a much more expanded series. It was bounded on the west, geologically, by the great Permian strata, and on the east by the lower Keuper Sandstone. This was an interesting district, geologically, because to the north there were enormous eruptions of greenstone and basaltic rocks, which showed that it had undergone great volcanic action. The thickness of the workable coal in the Coventry measures was from 5 to 6 ft. in each strata, and the total thickness of the various bands was about 20 ft. The greatest width at the surface was not more than four miles, and the workable beds of coal lay principally in the middle of the series, the lowest bed being only seen at Hartshill.

The lecturer next proceeded to speak of the range and extent of the coal fields of England and Wales, and expressed a decided opinion that the lower bands of coal in Devonshire do not belong to the Carboniferous, but to the Devonian or Old Red Sandstone period. The Dudley coal field differed from almost every other, for it rested immediately on the old Silurian rocks. He was decidedly of opinion that the coal fields of Derbyshire, Yorkshire, and Lancashire were once united, but that the intervening portions had been broken up, and become denuded and washed away, by the upheaval of the millstone grit and the mountain limestone, which formed the high wild moorland ranges between the coal fields of the three counties named. He next touched upon the manner in which the coal measures had been deposited; pointed out that the old theory of coal bands being deposited in basins scooped out of the mountain limestone was erroneous; and described the volcanic action, which, by upheaving or depressing the coal measures and superincumbent or subjacent strata, had caused those interruptions in the coal deposits that were technically termed "faults." He next showed, from the vegetable traces discovered in all coal measures, that coal was composed of vegetable matter; and expressed an opinion that it consisted principally of succulent plants. His view was that, most probably, the coal fields were on the margins of great seas, at the estuaries of large rivers, where there would be swampy jungles, such as were now to be met with in South America. There, from the humidity of the climate and the sub-tropical heat, the growth of vegetation would be exceedingly rapid, and the material for the formation of coal quickly produced. No doubt the coal beds were sunk down to the level of the sea, so that it swept over and covered them; and then they were subjected to successive upheavals and depressions. The identity of the plants found in the coal measures all over the world indicated a uniformity of climate during the Carboniferous period. He then pointed out that air-breathing molluscs, spiders, beetles, locusts, and grasshoppers, were found in the Carboniferous; affirmed that this showed the land was not untenanted during the Carboniferous period, and that such a murky atmosphere as had been conjectured did not exist, and expressed an opinion, which was held also by Prof. Huxley, that the remains of mammals might yet be found in the Carboniferous strata, and even in the great Silurian system, still further down. He spoke at some length of the origin of the carbon constituting the coal bands, which he ascribed to the gases emanating from the excessive volcanic action of the Carboniferous period, and the influence of the sun's rays and of the nebulæ and comets, which all contained a large amount of carbon.

Passing on to speak of the probable duration of English coal fields, the lecturer said that great diversity of opinion existed on this point, and many persons were great alarmists on the subject. There was no doubt the Staffordshire coal fields would last another 30 years, and the Newcastle beds another 200 or 300 years. He did not know how long the other English coal fields would last; but, supposing they were all exhausted, there still remained the enormous coal fields of South Wales, extending over an area of 1200 miles, which had, as yet, been little worked. He certainly thought that he might safely say that the South Wales coal fields, with the other beds now being worked, would last for another thousand years, and probably much longer. At the same time, without being an alarmist, he thought that the coal should be more carefully worked, that the great waste at the pits should be stopped, and that coal pits should not be filled up in the way they were when a great "fault" was discovered, as it would be very costly and difficult to strike upon the deposit of coal again at any future time. The rev. lecturer concluded with some observations on the important influence which coal had exercised upon the destinies of England.

UTILISATION OF SMALL COAL.—According to the invention of Mr. D. BARKER, of Northfleet, the coal or other carbonaceous material is reduced to a state of powder or minute division, and the particles combined or agglomerated by means hereinafter mentioned. For the the treatment of 1 ton of coal or other carbonaceous material about 1 cwt. of pitch or other ordinarily insoluble analogous resinous substance is added to about 2½ gallons of carbolic acid and from 5 to 10 lbs. of chloride of sodium (common salt), or other analogous salts, together with such a quantity of water as may be considered requisite. The compound is then boiled, by which means perfect mixture of the materials is effected, and a permanently liquid compound produced.

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PERMANENT WAY.

Extract from article entitled "The Railway Problem," in the *Times*, 20th October, 1869.
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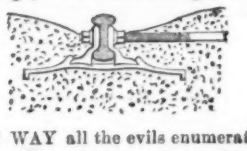

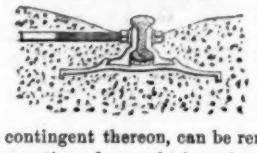

By this PERMANENT WAY all the evils enumerated above, with others contingent thereon, can be remedied. Timber sleepers are replaced by a rolled and curved plate of wrought-iron, grooved for the reception of wrought-iron jaws, which hold the rail instead of the present cast-iron chairs. Rods passing from one rail to the other maintain the gauge, and nuts on the ends of the rods lock the rails in their position. Where one rail meets the other longitudinally, the ends are fished by an extra length of jaw, making the joint perfectly sound and not harsh.

The ease with which ROLLING STOCK works over this road affords greater comfort to the passengers and is less destructive to the rails, tyres, and springs.

Its great simplicity is an additional advantage, and the form of the sleeper renders the operation of packing easy, while it being a practically permanent way, a minimum amount of expenditure will be incurred for repairs or renewals.

For FOREIGN RAILWAYS it is particularly valuable. There is a reduction of over 61 tons per mile in weight as compared with cast-iron roads, causing a corresponding saving in freight and carriage, and there is no loss from breakage.

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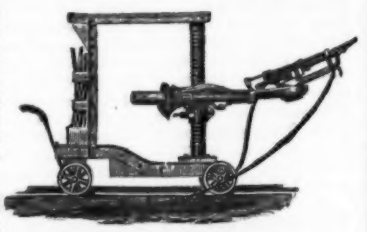

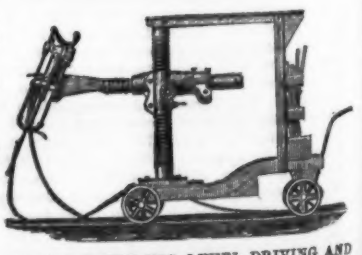

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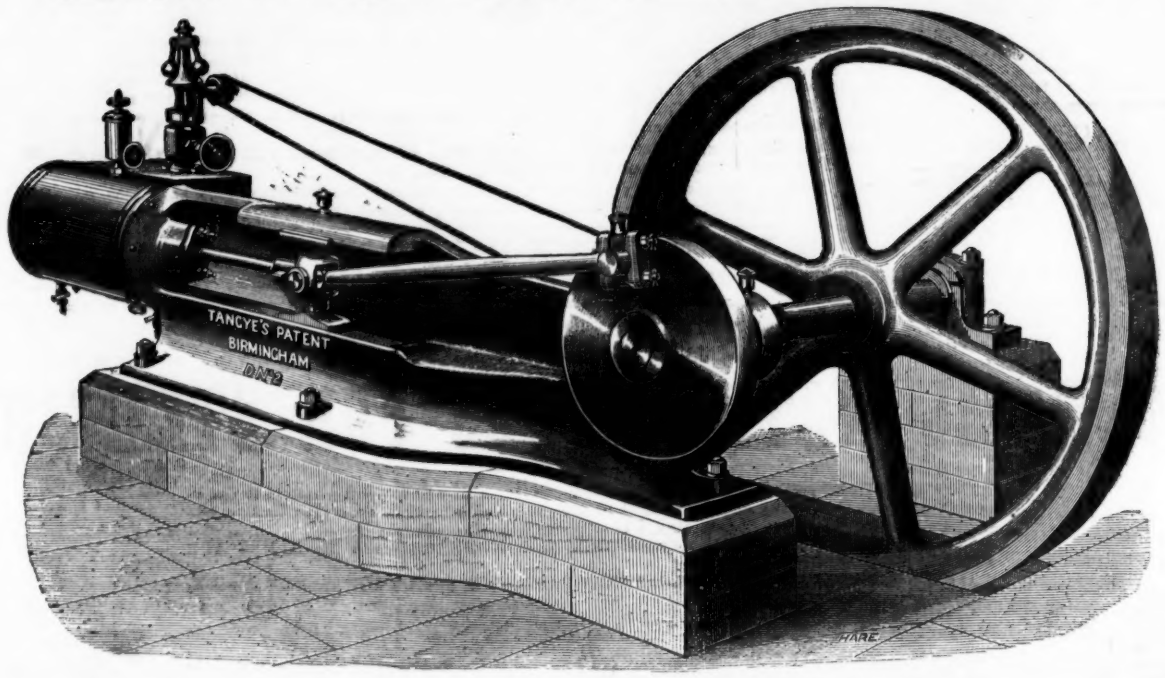

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THE WORKS.

THE "SPECIAL" STEAM PUMPS.

NOTE.

Each one is carefully tested with Steam and Water before leaving the Manufacturer.

In case of special quotations, the following particulars are required—viz.:

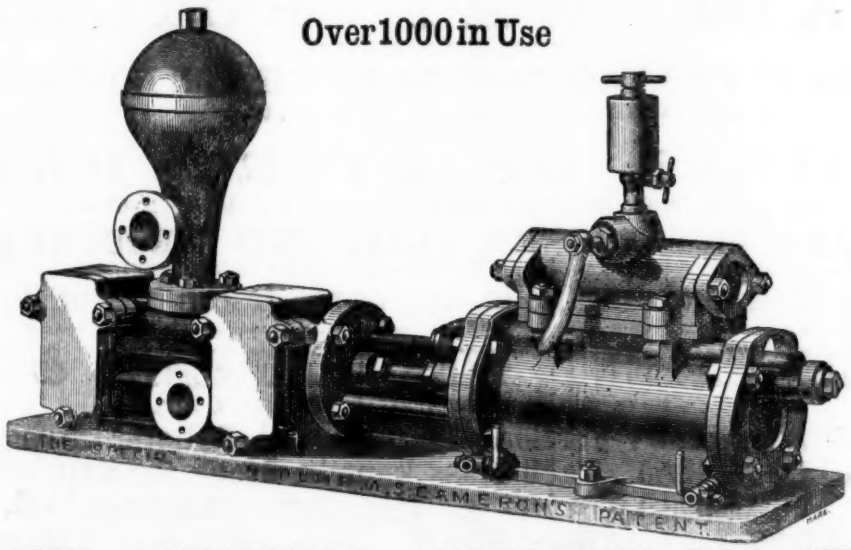
Pressure of Steam in Boiler.

The number of Gallons required to be lifted in a given time,

And the height of Lift from level of water to the point of delivery.

In ordering, state the purpose for which the pump is required, to ensure suitable valves being sent.

Over 1000 in Use



NOTE.

Requires NO Shafting, Gearing, Riggers, or Belts.

All Double-Acting.

Works at any Speed, and any Pressure of Steam.

Will Force to any Height.

Delivers a constant stream.

Can be placed any distance away from a Boiler.

Occupies little space.

Simple, Durable, Economical.

NO FLY-WHEEL, CRANK, GOVERNORS, CONNECTING ROD, GUIDE, OR ECCENTRIC.

Supplied to H.M.'s Arsenal and Dockyards at Woolwich, Chatham, and Devonport, also for use on board H.M.'s Ships, Hercules and Monarch.

FORTY THOUSAND GALLONS PER HOUR IS BEING RAISED 40 FEET HIGH AT MR. McMURRAY'S PAPER MILLS, WANDSWORTH, BY THE "SPECIAL" STEAM PUMP.

PRICES OF THE "SPECIAL" STEAM PUMPS.

Diameter of Steam Cylinder ..... inches	2½	3	4	4	6	6	6	7	7	7	8	8	8	8	10	10	12	12	14	16	24
Diameter of Water Cylinder ..... inches	1½	1½	2	4	3	4	6	5	6	7	4	6	7	8	6	7	8	10	12	7	10
Length of Stroke ..... inches	6	9	9	9	12	12	12	12	12	12	12	12	12	12	12	12	18	24	24	24	24
Strokes per minute	100	100	75	60	50	50	50	50	50	50	50	50	50	50	50	50	35	—	—	—	—
Gallons per hour	310	680	910	2900	1830	3250	7330	5070	7330	9750	3250	7330	9500	13,000	7330	9500	13,000	—	—	—	—
PRICE	£10	£15	£20	£30	£30	£40	£47 10	£50	£52 10	£57 10	£50	£55	£65	£75	£70	£80	£100	—	—	—	—

IF BRASS LINED, OR SOLID BRASS OR GUN-METAL WATER CYLINDERS, WITH COPPER AIR VESSELS, EXTRA, ACCORDIN TO SIZE

Any Combination can be made between the Steam and Water Cylinders, provided the Lengths of Stroke are the same, thus—8 in. Steam and 3 in. Water, or 10 in. Steam and 3 in. Water, adapted to height of lift and pressure of steam, and so on.

TANGYE BROTHERS & HOLMAN: Offices & Warehouse, 10, Laurence Pountney-lane, London, E.C.

GWYNNE AND CO., ENGINEERS,

ESSEX STREET WORKS, STRAND, LONDON, W.C.

Fig. 48. Fig. 146. Fig. 142. Fig. 22. Fig. 134. Fig. 106. Fig. 43. Fig. 86.

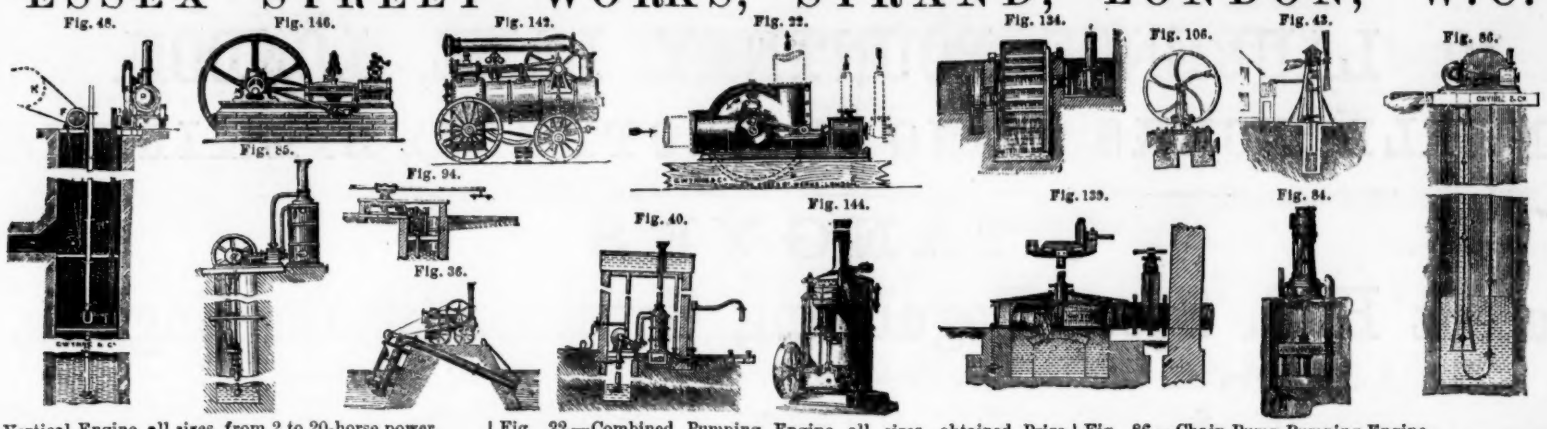


Fig. 85. Fig. 94. Fig. 144. Fig. 139. Fig. 84.

Fig. 36. Fig. 40.

Fig. 144.—Vertical Engine, all sizes, from 2 to 20-horse power.
Fig. 146.—Horizontal Engine, from 4 to 100-horse power.
Fig. 142.—Portable Engine, from 2½ to 30-horse power.
Fig. 40.—Gwynne and Co.'s Combined Stationary Pumping Engine.
Fig. 139.—Turbine Water-wheel, from 1 to 300-horse power.

Fig. 22.—Combined Pumping Engine, all sizes, obtained Prize Medal, Paris Exhibition.
Fig. 85.—Deep Well Pumping Engine, all sizes.
Fig. 134.—Water-wheel Pumping Machinery.
Fig. 36.—Gwynne and Co.'s Patent Syphon Drainage Machinery.
Fig. 95.—Horse-power Pumping Machinery.

Fig. 86.—Chain Pump Pumping Engine.
Fig. 48.—Deep Mine Centrifugal Pumping Machinery.
Fig. 84.—Double-acting Vertical Pumping Engine.
Fig. 106.—Gwynne and Co.'s Improved Plunger Hand Pump.
Fig. 43.—Wind Power Pumping Machinery.

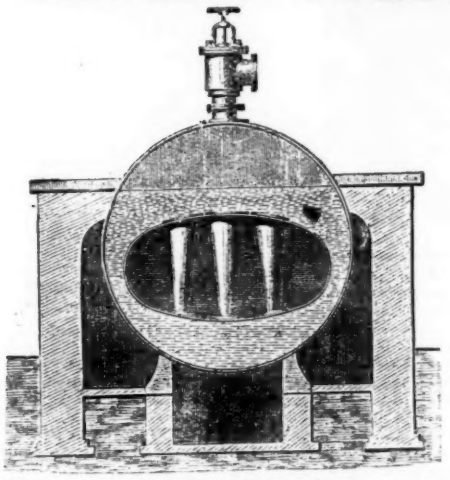
Steam Engines of all kinds and sizes, Hand and Steam Fire Engines, Water Wheels, Hydraulic Lifts, Cranes and Jacks, Steam and Water Valves, Hydraulic Presses, Sheep Washing Machinery, &c., &c.

List of Centrifugal Pumps, two stamps. Illustrated Catalogues of Pumping Machinery, six stamps. Large Illustrated Catalogue, with many Estimates, &c., twelve stamps. All post free.
GWYNNE and Co. have recently effected a considerable reduction in their prices, being determined to supply not only *the best* but *the cheapest* Pumping Machinery in the world.

GWYNNE AND CO.,

HYDRAULIC AND MECHANICAL ENGINEERS, ESSEX STREET WORKS, STRAND, LONDON, W.C.

GALLOWAY'S
PATENT CONICAL WATER TUBES FOR STEAM BOILERS.



Section of the "Galloway" Boiler, showing arrangement of back flues, the furnaces being of the same construction as in the common two-flued boiler.

The above TUBES are made with such an amount of taper as will allow the bottom flange to pass through the hole in the upper side of the boiler flue, which renders their introduction into ordinary flued boilers a simple operation, and with the following advantages :—
The POWER of the BOILER is CONSIDERABLY INCREASED, and the FLUES ARE MATERIALLY STRENGTHENED.
The CIRCULATION of the WATER is MUCH IMPROVED, and UNEQUAL EXPANSION, with its attendant evils, PREVENTED.
LIABILITY TO PRIME IS LESSENED.

These Tubes have now been in use upwards of fourteen years, and above 50,000 are in work in various parts of the country with the best results.
They can be fixed by any boiler maker, but can only be obtained from the Patentees,

W. & J. GALLOWAY & SONS,

ENGINEERS AND BOILER MAKERS,

MANCHESTER,

Makers of Wrought-iron Parallel Tubes, 40s. p. cwt.

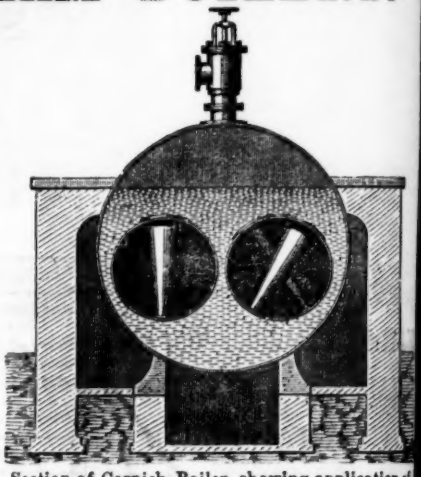
MANUFACTURERS OF THE WELL-KNOWN

"GALLOWAY BOILER,"

AS PER SKETCH ANNEXED.

UPWARDS OF TWO THOUSAND OF WHICH ARE NOW AT WORK.

BOILERS OF ANY DIMENSIONS, UPON THIS OR ANY OTHER PLAN, CAN BE DELIVERED WITHIN A FEW DAYS FROM RECEIPT OF ORDER.



Section of Cornish Boiler, showing application of the "Galloway" Tubes.

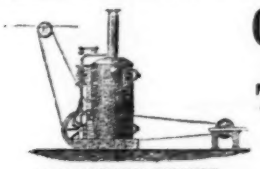
STEAM ENGINES OF EVERY DESCRIPTION.

General Millwrighting.—Hydraulic Machinery.—Polishing, Grinding, and other Machines for Plate Glass.

LEAD ROLLING MILLS AND PIPE PRESSES. CAST AND WROUGHT-IRON GIRDER BRIDGES.

HALEY AND OTHER LIFTING JACKS, BOILER RIVETS, &c.—SCREW BOLTS, STEEL PUNCHING BEARS.

Shearing and Punching Machines Bending Rolls, and every description of Boilermakers' Tools, &c., &c.



STATIONARY ENGINE.

CHAPLIN'S PATENT STEAM ENGINES & BOILERS.

(PRIZE MEDAL, INTERNATIONAL EXHIBITION, 1862),

The ORIGINAL combined Vertical Engines and Boilers, introduced by Mr. CHAPLIN in 1855. Each class kept in Stock for Sale or Hire.

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STEAM CRANE.

ROBEY AND COMPANY, LIMITED,

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PATENT PORTABLE

HAULING AND WINDING ENGINE,

WITH

PATENT DRUM WINDLASSES,

FOR MINING PURPOSES.

This Engine is specially commended to Mining Engineers and others, as by its adoption—
Haulage along inclined drifts is easily and cheaply effected.
The expense of sinking new shafts is greatly reduced, neither foundations nor engine-house being required.
It is available not only for winding, but for pumping, sawing, &c.—a great desideratum at a large colliery.
It can be very quickly removed (being self-propelling), and fixed in any desired position.

Prices and full particulars on application as above, and also references to view the Engine in successful work near Derby, Carnarvon, Haverfordwest, Darlington, and other places.

HEPBURN'S PUMP LEATHER WATERPROOF

By a special method of preparation, this leather is made solid, perfectly close in texture, and impermeable to water; it has, therefore, all the qualifications essential for pump buckets, and is the most durable material of which they can be made. It may be had of all dealers in leather, and of

I. AND T. HEPBURN AND SONS,

TANNERS AND CURRIERS, LEATHER MILLBAND AND HOSE PIPE MANUFACTURERS,

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